

Working Paper Series



Final Evaluation of the
Obstetrical Access Pilot Project
July 1979 - June 1982

Maridee Gregory, M.D. Project Director

Federal Project Officers:

Tony Hausner, Ph.D.
Andrew Solarz, Ph.D.

Department of Health and Human Services
Health Care Financing Administration
Office of Research and Demonstrations

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**State of California
Department of Health Services
Sacramento, California**

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Any project that has spanned six years from the genesis of the initial idea through the operational phase to the evaluation phase is the result of the talents and efforts of many people. In this section we have tried to identify those who have contributed so willingly of their time and expertise. As with any such list, we wish to apologize to any individual or group whose name has been inadvertently omitted.

There is one group of names we cannot include in our list, but they are by far the most important group to be thanked. They are 7,000 women and their babies who were the participants in the project. Their compliance and participation in the project led to its success. Their efforts to come in and receive planned prenatal care made the greatest contribution to the work of the project. The contractors and their staff who provided the care were the second most important group. Many staff, from the appointments clerk to the physicians, made it work. They all participated willingly and put up with what often appeared to be excessive bureaucratic requirements and delays caused by the slow moving State system.

As with any final research report, the credit may be distributed, but the responsibility for the final report and its contents remains that of the authors.

The encouraging aspect of this report is that although it is the end of a project, it is also the beginning of a new era in prenatal care. As a result of the project, the State of California approved legislation adopting OB Access type standards and packages of perinatal services for the Medicaid and low income women who are receiving services from these public programs and the United States Congress approved the Child Health Assurance Program that expands the groups of pregnant women who are eligible for coverage for Medicaid prenatal care services.

Many thanks to all who have helped the project succeed and let us all continue to work on the issue of reducing low birthweight infants and increasing access to public prenatal care programs.

Project Directors

Maridee Gregory, M.D. (1983-84)
Lyn Headley, M.D. (1981-82)
Anne Kilty, R.N., M.S. (1980-81)
J. Athole Lennie, Dr.P.H. (1978-80)

OB Access Team

Rosalee Black, M.S.W. -- Public Health Social Work Consultant (1981-82)
Marvin Crabb -- Administrator (1977-84)
Carol Gardner -- Accounting Technician (1981-83)
Rosalind Gordon, M.P.H. -- Health Education Consultant (1981-82)
Lyn Headley, M.D. -- OB/GYN Consultant (1977-80)
Joann Jones -- Statistical Clerk (1983-84)
Anne Kilty, R.N., M.S. -- OB/GYN Nurse Consultant (1978-80)
Joseph Klun -- Research Specialist (1979-84)
Diana Lee, M.P.H. -- Nutritional Consultant (1977-80)
Rita LeGarde -- Management Services Technician (1983-84)
J. Athole Lennie, Dr.P.H. -- Research Consultant (1982-84)
Mildred Mayberry, M.S.W. -- Public Health Social Worker Consultant (1977-83)
Audrey Mayes, R.N., M.P.H. -- OB Nursing Consultant (1980-81)
Helen Mortenson, M.P.H. -- Health Education Consultant (1978-82)
Glenn Penner -- Health Analyst (1983-84)
Linda Maria Reese, M.P.H. -- Nutritional Consultant (1981-82)
Donna Steen -- Statistical Clerk (1981-84)
James Sutocky -- Research Analyst (1981-83)
Minoshia Turk -- Management Services Technician (1981-83)

Claims Unit

Tom Hall -- Claims Unit Manager (1980-83)
Jay Case
Elizabeth Connelly
Joanne Jenkins
Alethea Lewis
Phyllis Tofanelli

Volunteers

Naomi Hauf
Dorothy McMillan

Federal Project Officers

Tony Hausner, Ph.D.
William Pembleton
Andrew Solarz, Ph.D.

Medi-Cal Alternative Health Systems

Vic Boisseree
Dale Chun
Dick Lohmeyer
Jan Robinson
Roark Vane
Estella Vasquez
Roxanne Villa

OB Access Ad Hoc Advisory Committee

Sarah Erlach, R.N., M.P.H.
Louis Leary, M.A.
Nona Deer
Lloyd Bond, M.D., M.P.H.
Everett Beck
Bernice Gianciracusa, M.D., M.P.H.
Linda Bolton, R.N., M.N., M.P.H.
Stephen Shubert, M.P.H.
Sandra Salazar, J.D.
Anne Grogan, J.D.

OB Access Advisory Panel

Alfred Hexter, Ph.D.
J. Athole Lennie, Dr.P.H.
Frank Norris, M.A.
Richard Snow, M.A. (ex-officio member)
Ronald Williams, Ph.D.

Other Assistance

Maternal and Child Health Staff

Tamara Anderson
Cheryl Bryant
Siegfried Centerwall, M.D., M.P.H. -- Former Chief
George Cunningham, M.D., M.P.H. -- Former Chief
Peggy Giannoni
Maridee Gregory, M.D. -- Chief
Warren Hawes, M.D., M.P.H.
Sally Jacober
Penelope Stephenson, M.A.

Secretarial Assistance

Fran Asato
Doris Barrows
Michelle Harden
Rita Sawyer
Jerome Tribble

Center for Health Statistics

Al Bradley, M.A.
Clarence Brown
John Keith, M.A.
Kay Moser
Anthony Oreglia, M.S.

Office of Program Planning and Analysis

Joseph Hafkenshiel, M.A.
Louis Leary, M.A.

Private Consultant

Linda MacKenzie, R.N.

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EXECUTIVE SUMMARY

The OB Access project was a pilot project which operated in 13 California counties from July 1, 1979 to June 30, 1982. The project goals were to both improve access to care in underserved areas and improve pregnancy outcomes by providing enhanced prenatal care. The project registered 6,774 women. Of the 5,388 who completed care and gave birth to live infants, 2,575 were Medi-Cal beneficiaries and 2,813 were Title V, low income mothers.

The findings of the study are as follows:

- o There was increased access to care through the contractual mechanism developed by the project.
- o 87.2 percent of the registrants started prenatal care during the first or second trimester.
- o Continuity of care was provided; 84 percent of the registrants completed care in spite of a variety of access barriers.
- o Pregnancy outcomes for the OB Access mothers were superior to a matched group of similar mothers from the same counties. The OB Access mothers had a low birthweight rate of 4.7 percent compared with the match group of 7.0 percent. This indicates that the enhanced OB Access project prenatal care program was effective.
- o The cost of providing this enhanced care was 5.0 percent higher than the average cost of care provided under the current Medi-Cal program.
- o Benefit-cost ratio of this OB Access program is 1.7-2.6:1 for the short run, and probably greater in the long run, when compared with the Medi-Cal program.

The recommendations based on the findings are:

- o The adoption of the OB Access pilot program scope of benefits statewide for the Medi-Cal program, including nutritional health education and psychosocial care services from appropriately qualified Medi-Cal providers.
- o Implementation of a reimbursement mechanism for the purchase of these enhanced maternity care services.

INTRODUCTION

Background and History of the OB Access Project

Throughout history different cultures have perceived life's most natural phenomenon, the birth process, in varying ways. The natural birth of the frontier and rural mother in the 19th and early 20th centuries has changed during the last 50 years. It has been transformed into a clinical and medical event. The societal and clinical improvements in prenatal, delivery, and postpartum care have dramatically reduced both maternal and infant mortality rates.

Most recently, two dominant trends have been observed in pregnancy management. The first is dramatically improved survival of low birth-weight infants through technical improvements of neonatal care. Second, the birthing process itself is now perceived as something more than a clinical experience. 1/ The "humanizing" school of thought has supported and encouraged alternative birth centers, midwifery, and the La Maze and Bradley birthing methods. Infant bonding techniques, such as Le Boyer, have also led to an increasing emphasis, not only on delivery, but also on the value of support services at all phases of the birth process. Such support services have historically not been a clearly identified part of medical care management.

These have been the main direction of trends in maternity care in the United States over the last two decades. These developments have not been without discussion and serious debate. In spite of these trends which have benefited the majority of childbearing women, certain groups of women and their babies have not attained the same level of benefits. For example, certain population groups do have low birth-weight rates consistently higher than the population as a whole. 2/ The analysis of these data do indicate a high correlation between the incidence of low birthweight and low income groups. With the increase in public expenditures for health care, there is increasing concern about the high cost of neonatal intensive care and infant hospitalization. These costs are generated primarily from the care provider to low birth-weight babies and are frequently paid by state and federal programs.

Over the past 15 years, the drop in infant mortality has been impressive, and largely attributable to the improvements and the developments in postdelivery care. The technology of neonatal intensive care has resulted in the survivorship of increasing numbers of low and very low birthweight infants. This project has chosen a different and certainly not mutually exclusive approach of focusing on the prenatal care aspects. It is believed that by the improvements in prenatal care, a percentage of those who would have been low birthweight infants can be converted to normal birthweight.

In the absence of other explanatory variables such as age of mother, genetic factors, etc., the primary reason for the difference in birth-weight outcomes appears to be due to the duration and nature of the care

process. Accordingly, the poorly nourished mother with minimal care does not do as well as the well-nourished mother with comprehensive care. Other factors, such as living arrangements, supportive environment, and care during pregnancy, also affect their outcomes. 3,4,5,6,7,8/

Due to the State's enactment of Title XIX of the Social Security Act, California had a broadly defined set of eligibility criteria that enabled most low income women to qualify for health insurance coverage under either the Medi-Cal program or the Medically Indigent Adult program. The legal entitlement to care from health care providers is one aspect; the availability of willing providers is another.

Traditional maternity care benefits were provided through the global fee billing method, e.g., one set fee was paid for prenatal care, professional delivery, and postpartum care. Because the billing was nondetailed, it was impossible to determine what specific services were provided to an individual.

The State of California has had a long commitment to the mothers and children in the State through the mainstream Medi-Cal program, as well as other federal and state programs serving low income patients. The State has also supported several pilot projects to evaluate and care for low income women and infants, using both federal Title V and state funds.

There were an increasing number of complaints from providers about their inability to provide adequate prenatal care at the prevailing Medi-Cal rates of reimbursement. There were also complaints from patients and communities that many Medi-Cal eligible and other low income women were experiencing severe problems in obtaining access to physicians, particularly to physicians with formal training and experience in obstetrics. It was clear from these formal expressions of concerns from the California Conference of Local Health Officers and representatives of the community clinics that two potential problems existed: poor reimbursement and lack of access to prenatal care.

As a result, Assembly Bill 4242 (AB 4242) was enacted in 1977 as an emergency statute to revise physician reimbursement and stimulate Medi-Cal provider participation in primary and maternity care. Although initially well accepted, the results were reported as ineffective by House Resolution 70 in 1979. 9/ Using the availability of obstetrics as an indicator, it was found that 20 of the 58 counties in California had no resident OB/GYNs who accepted Medi-Cal beneficiaries, and the proportion of OB/GYNs who did accept Medi-Cal patients actually declined from 65 percent in 1974 to 46 percent in 1977.

Substantial variations existed in maternal and child health status indicators between counties. Perinatal mortality varied even after adjustment for risk factors and chance variations. Variations existed

in the availability of medical care and concentrations of high-risk women in certain areas. Based on the above-mentioned problems, the Department of Health Services' (DHS's) Maternal and Child Health (MCH) Branch assisted the Office of Planning and Program Analysis in preparing a report entitled "Increasing Access to Obstetrical Services in the Medi-Cal Program" (1977). Concurrent with preparation of that report, AB 1693 was enacted which permitted the implementation of pilot projects for health programs. The proposed pilot projects would reimburse health departments or other qualified providers for maternity-related services on a capitation basis. The project would be funded by Title XIX and Title V and administered jointly by the Department's Medi-Cal and MCH programs.

Implementation Procedures and Problems

A Medi-Cal/MCH OB Access Program was designed to address some of the immediate needs of providing perinatal care and to develop a source of reliable data for future planning. The main goals of the project were to:

- o Provide better access to comprehensive obstetrical services for Medi-Cal eligible mothers in areas where there were no resident obstetricians or where resident care providers declined to accept Medi-Cal patients.
- o Reduce the perinatal mortality and morbidity rates and the percentage of pregnancies with complication.
- o Evaluate the benefits and costs of using this strategy of providing comprehensive care to Medi-Cal and low income women.

The goals of the project were based on previous research by many groups. The notion of comprehensive obstetrical services needs some further discussion. The project determined that the majority of Medi-Cal low income patients would need not only the early medical services including risk screening, but also nutritional assessment, prenatal vitamins/minerals, health education, and psychosocial assessment. (Appendix A provides comprehensive guidelines for the project.) Comprehensive care also meant the coordination of existing public programs, such as Women, Infants, and Children (WIC) supplemental feeding, genetic screening, and Family Planning services. The provision of an early and comprehensive range of services would benefit these high risk women and should be provided in a coordinated manner by a health care professional team with the appropriate discipline skills.

The thrust was to help establish these health care delivery arrangements in those areas of greatest need by building on the strengths of the existing system. The project was experimental and piloted in 11 different counties throughout California.

In order to implement the project, waivers were solicited from the Department of Health and Human Services and the Health Care Financing Administration. The waivers were granted under Section 1115 (a) of the Social Security Act for a period of three years ending June 30, 1982 (renewable annually).

The project provided for a joint approach to both the financing and delivery of services in underserved areas. The skills of the MCH professionals and the fiscal expertise of the Medi-Cal Division were called upon.

An advisory committee composed of representatives from health care providers, consumers, and professional groups was established. Committee members were chosen to represent all geographical areas of the State. A Request for Proposal was issued and 30 groups responded. The committee recommended 11 provider groups in obstetrically underserved areas, which appeared to have the ability to provide the amount and range of services specified under the program to be considered for participation in the project. State staff conducted on-site visits with those 11 organizations.

After judging their probable capability to provide a comprehensive package of prenatal care services, the OB Access project required providers to adopt protocols and procedures that would assure quality maternity care services. In most cases, additional resources were needed to help those providers in underserved areas meet program requirements. However, no start-up monies were available from the State. The agencies selected for participation were existing community clinics and county health departments interested in expanding their prenatal services. No private providers were willing to participate as primary contractors, although they did participate as subcontractors of medical care services. This arrangement resulted in the active participation of several excellent private physicians and some supervised nurse midwives in areas where no prenatal care services had existed for Medi-Cal and low income women. The State contracted with both private and public providers in these areas.

Concurrent with contractor selection, the program details, contracts, and other provisions were developed by the Departments of Health Services and Finance. The benefits package was drafted in 1978 and was approved in January 1979. Two grant applications under Section 1115 (a) of the Social Security Act were submitted requesting authorization to pay for an additional scope of services for selected beneficiaries (waiver of statewideness) and requesting a waiver of the registrant's Medi-Cal spenddown requirement. A separate grant application was prepared in September 1979, requesting funds for support of the OB Access Pilot Project Evaluation. The grant was authorized March 31, 1980. The pilot project had commenced with seven contractors in July 1979, and four more were phased in during January 1980.

After the on-site review process, 11 contractors were selected. The State of California has a complex contract processing system which requires approval through many steps. The result is that for any non-standard contract, there must be exhaustive review and meetings between both the initiating department, as well as the control departments, e.g., the Department of Finance and the Department of General Services. At the contractor's level, the process is much speedier. On the average, it took five months for contract approval before the contractor could begin the program.

The project used this interim period to work with contractors' staffs in assisting them in program preparation. Issues such as the use of uniform data collection forms, patient education materials, and finalization of arrangement for the planned hospital delivery had to be resolved at the local level. At the state level, we had to hire our own staff and develop an accounting system for processing contractor claims.

Overview of Individual Projects

The contractors represented the State professionally, as well as geographically and ethnically. In the northern part of the State, at Trinidad, we had a contract with United Indian Health Services. This is a community nonprofit clinic that serves a predominantly Native American population which is rancheria-based (a collection of small, noncontiguous parcels of Indian land). The project offered a full range of ambulatory services housed in a modern clinic. The majority of the funding for this contractor came from Indian Health Services and other grant sources. This contractor participated in the program for one year, and subsequently withdrew because it was felt that the data collection and administrative requirements were greater than could be undertaken.

The second contractor, the Northeastern Rural Health Clinics, is a dynamic and energetic community clinic system that served patients at four clinic sites in four counties. Although the services differed slightly at each clinic, they offered a broad range of ambulatory and WIC services. They also succeeded in recruiting a husband and wife physician, a board certified pediatrician, and an OB/GYN team. These resources greatly enhanced the quality of medical care.

The third contractor was the Northern California Coalition for Rural Health, a small provider that operated two clinics, one located in Shasta County and the other in the remote southern part of Trinity County. This group also subcontracted with a nurse midwife who operates in the northern part of Trinity County. She worked under the supervision of a board certified physician who was based in a city some 40 miles distant. She also had working relationships with local family practitioners. This was one of the most innovative methods developed to bring quality care to underserved remote populations. The contractor also subcontracted with Mayer Memorial Hospital at Fall River Mills.

The fourth OB Access contractor was Clear Lake Indian Health Board. They served a two-county area -- all of Lake County and part of Mendocino County. They subcontracted with a private practice, board certified OB/GYN group that worked with the family practice physicians employed by the clinic. This contractor also worked with another nonprofit community clinic and the public health department, which allowed most Medi-Cal and low income women in the area to participate in the OB Access Pilot Project.

The next three projects were located in an urban region of Alameda County in the San Francisco Bay area. These included the City of Berkeley Health Department, which had a well-established program of community health services and served a low income minority and counterculture group of patients; the East Oakland Health Alliance, a nonprofit community clinic, which served a predominantly black population; and the La Clinica de la Raza, a community clinic group, that served a predominantly Hispanic population. All of these provider groups were able to provide high quality care in a culturally acceptable manner. They worked with major hospitals in their area to coordinate care and, by using community resources, were able to provide continuity of care.

The eighth provider was Kings County Public Health Department, which is located in the southern part of rural San Joaquin Valley. This agency built on the strengths of the county system and subcontracted with private providers to offer part of the maternal care.

Another provider was Santa Barbara County Health Department. The county has a well-developed public health department that served predominantly Hispanic and Southeast Asian women. Due to the OB Access funding process, some private providers, who had previously been unwilling to see Medi-Cal patients joined the project as subcontractors. The County also subcontracted with Casa de la Raza to deliver care at two sites which served predominantly Spanish surname patients.

In the most southern part of the State, a contract was negotiated with a consortium made up of the San Diego County Health Department, the University of California, San Diego, and community clinics. Most of the patients in this area were Hispanic. University clinics, community clinics, and county clinic facilities were used. This contractor provided a highly integrated service using a computer-based information system. All levels of care were represented in this model, from the community clinic to the tertiary care university teaching hospital.

As described above, the contractors do provide good examples of how to implement OB Access type programs in different contexts. The mechanics of each project differed slightly, and it may be of interest to briefly describe how projects registered women. All contractors had outreach programs to inform women of the program's existence. Various methods of outreach were employed. Some used public service announcements on local radio and T.V.; others used community meetings, such as church groups.

Public health department informational brochures, welfare workers, and local newspaper articles were used to publicize the program. However, the most effective method appeared to be word-of-mouth from patients who were satisfied with the care that they were receiving.

Upon pregnancy confirmation, the OB Access program was explained in English or in the client's native language. Clinics made arrangements for bilingual staff to be present during all subsequent visits. Once the patient agreed to attend all medical appointments and birth education sessions, and comply with all medical care recommendations, she was asked to sign a consent form.

These forms clearly indicated all aspects of the program, and the contractor staff answered any of her questions. Payment source for care was also discussed. Those women who were not on Medi-Cal were encouraged to apply, if appropriate. Those who had been determined not to be eligible for Medi-Cal were screened for Title V financial eligibility.

Once the women were screened and applied for participation in the program, the contractor forwarded the document to the State for review and approval. After approval, the State issued the contractor an interim payment of \$250 for the patient's care. Once all care was provided, the contractor then submitted a final itemized invoice with copies of the medical records. Clinical and financial data were abstracted from these documents.

Summary

The OB Access Pilot Project was funded from July 1, 1979 through June 30, 1982 and registered a total of nearly 7,000 women. The project achieved its basic goal of bringing prenatal health care services into underserved areas. Project evaluation was completed in June 1984. This report presents significant findings from the project and recommends some further action.

During the writing of this report, California State Assembly Bill 3021, which proposed to incorporate the main features of this OB Access Pilot Project into the State's Medi-Cal program, became law. Implementation planning is currently under way.

DISCUSSION

Demographic Characteristics of Registrants

The following section describes the women who agreed to register and participate in the OB Access project according to seven characteristics. Four of the characteristics (County of Residence, Age, Race/Ethnicity, and Pregnancy History) are particularly important to the subsequent analysis because these were variables used to select Medi-Cal comparison cases from the 1978 California Live Birth file. These four, as well as the other three characteristics (Marital Status, Educational Level, and Preexisting Risk Factors) contribute to an understanding of those women who were served by the project and what their special needs were.

County of Residence for Women Registered in the OB Access Project

A total of 6,774 women registered in the project during the period from July 1, 1979 through June 30, 1982. The distribution of OB Access registrants by their County of Residence is shown on the California county map in Figure 1. The counties served by OB Access contractors are listed beside the map, and these counties are designated by shading on the map. The numbers represent the number of women residing in each county who were served through the OB Access project.

As would be expected, the 13 OB Access counties accounted for the majority (6,648, or 98.1 percent) of the women registered. The remaining 126 women, for the most part, resided in counties adjacent to the OB Access counties. One registrant came from out of state and is not shown on the map. The greatest number of women were residents of San Diego, Alameda, Santa Barbara, and Kings Counties.

Age of Registrants

Table 1 shows four demographic characteristics of women registered in the OB Access project. Age of mothers is listed first. The age categories are set up primarily to isolate the numbers of teenage (under 18 and 18-19) and older mothers (over 35 years of age), because these women may be at increased perinatal risk. The broad range from 20 through 34 years of age is not subdivided, although it includes 72.0 percent of the registrants. The under 18 years of age category includes 9.7 percent of the women, the 18 and 19 years of age category includes 13.9 percent, and the 35 years of age and over category comprises 4.4 percent. The median age for women registered in the project was 23.0 years.

FIGURE 1

NUMBER OF OB ACCESS REGISTRANTS BY COUNTY OF RESIDENCE



For the purpose of comparability with data from other sources, the mothers' age was computed as of the delivery date rather than at the time of registration into the project. When the infant's date of birth was unknown, the original estimated date of confinement (EDC) was substituted for the delivery date in the computation of age.

Race/Ethnicity of Registrants

The racial/ethnic composition of the OB Access registrant group is presented next in Table 1. The 3,264 Mexican American/Hispanic registrants comprised 48.2 percent of the project group and were the largest single ethnic group served. These were served primarily in the larger programs in San Diego, Santa Barbara, and Alameda (under La Clinica de La Raza) Counties. White registrants accounted for 1,889 (27.9 percent) and Black registrants for 692 (10.2 percent) of the total women registered.

While three contractors (Clearlake Indian Health, Sonoma Indian Health, and United Indian Health) primarily targeted the American Indian population in their areas, the total women registered included only 160 American Indians. Two factors may account for this low number. First, these projects all served smaller population groups in less populated northern counties. Second, one contractor withdrew from the project during the second year and another ceased operation during the third year.

Another relatively large component of the women registered was the Southeast Asian population -- served mainly in San Diego County. These women are included among the 490 registrants in the "Other" category.

Marital Status of Registrants

Table 1 also shows the marital status of women at the time of registration into the project. The majority of women (59.3 percent) were married. The 37.1 percent who were not married include those who were divorced, separated, or widowed, as well as those who were single. For the remaining 3.6 percent of the women, marital status was unreported.

Years of Formal Education

Lastly, Table 1 summarizes the educational level of women registered in the OB Access project. The largest group of women (39.3 percent) had completed all or some high school training (9 through 12 years of education). The next largest group (24.5 percent) included those who had completed 1 through 8 years of schooling. Only 12.9 percent had gone beyond high school (13 or more years of education). A small percentage (0.8 percent) had had no formal education. Education was not reported for 22.5 percent of the women.

Table 1

Demographic Characteristics of OB Access Registrants

Characteristics of Registrants	Registrants	
	Number	Percent
Total	6,774	100.0
Years of Age <u>1</u> /		
Under 18	655	9.7
18-19	944	13.9
20-34	4,874	72.0
35 or Over	301	4.4
Race/Ethnicity		
White	1,889	27.9
Black	692	10.2
Mexican American	3,264	48.2
American Indian	160	2.4
Other	490	7.2
Unknown	279	4.1
Marital Status		
Married	4,018	59.3
Not Married	2,512	37.1
Unknown	244	3.6
Years of Formal Education		
None	160	2.4
1-8	1,661	24.5
9-11	1,277	18.9
12	1,386	20.5
13 or More	875	12.9
Unknown	1,415	20.9

1/ Years of age at actual or projected time of delivery.

Note: Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Pregnancy History of Registrants

Pregnancy history is presented as a cross-tabulation of parity by gravidity in Table 2. Gravidity is defined as the total number of pregnancies (including the present pregnancy) regardless of their duration or outcome. Parity refers to the number of pregnancies that have reached viability and have been delivered -- regardless of the child's status (alive or dead) at birth and regardless of the number of children involved in the case of multiple births. Parity in Table 2 is as determined at the time of registration and does not include the present pregnancy.

As shown in Table 2, a total of 2,059 (30.4 percent) of the registrants were pregnant for the first time (Gravidity = 1). Column subtotals indicate how many registrants were experiencing their second (26.4 percent), third (17.6 percent), fourth (10.5 percent), and fifth or greater (13.6 percent) pregnancy. Gravidity/parity were not reported or unknown for only 1.5 percent of the cases.

Although other pregnancy history data (e.g., term pregnancies, premature birth, and spontaneous or induced abortions) were collected, these are not analyzed or reported here. They are generally found to be less well reported and less reliable than the gravidity and parity information.

The cross-tabulation of parity by gravidity in Table 2, however, does give some indication regarding outcomes for the registrants' previous pregnancies. For example, the two rows under Gravidity 2 show that 32.7 percent of those in this subgroup were anticipating their first delivery (Parity = 0), while 67.3 percent had delivered previously. Similar information is contained within each gravidity grouping.

Table 2

Pregnancy History of OB Access Registrants, Parity by Gravidity

Gravidity <u>1</u> / and Parity <u>2</u> /	Registrants		
	Number	Percent of Same Gravidity	Percent of Grand Total
Total	6,774	100.0	100.0
Gravidity 1	2,059	100.0	30.4
Parity 0	2,059	100.0	30.4
Gravidity 2	1,790	100.0	26.4
Parity 0	586	32.7	8.6
1	1,204	67.3	17.8
Gravidity 3	1,191	100.0	17.6
Parity 0	189	15.9	2.8
1	408	34.2	6.0
2	594	49.9	8.8
Gravidity 4	706	100.0	10.5
Parity 0	52	7.4	0.8
1	127	18.0	1.9
2	241	34.1	3.6
3	286	40.5	4.2
Gravidity 5 or More	925	100.0	13.6
Parity 0	23	2.5	0.3
1	72	7.8	1.1
2	122	13.2	1.8
3	185	20.0	2.7
4 or More	523	56.5	7.7
Gravidity Unknown	103	100.0	1.5
Parity Unknown			

1/ Number of total pregnancies including the current one.

2/ Number of previous deliveries.

Note: Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Preexisting Risk Factors

Medical histories taken at the comprehensive (usually the first) medical exam, included the identification of previous or existing conditions and health practices which could pose a risk to the current pregnancy. A maximum of five risk factors were extracted during coding and key entered for any one registrant. If more than five had been listed, those judged to be the most serious were selected for key entry. The incidence of the various factors among the project group is outlined in Table 3. Forty-four factors are ranked according to frequency of occurrence among 5,788 cases where risk factors were noted.

Although generalized factors such as "familial history of disease or abnormality", "other factors", "blood dyscrasia", "gynecological disorders", and "stress" received some of the highest ranks, more specific problems also were noted in significantly large numbers of women. Other factors with top ranks included: language barriers, cigarette smoking, chronic renal or kidney disease, prior prenatal or labor and delivery problems, Rh and ABO sensitivity/isoimmunization, obesity, and chronic lung disease.

The clinical evaluation of preexisting risk conditions is somewhat poorly reported in the present study. For the 986 cases (out of 6,774) not represented in Table 3, approximately 250 are known to have had no risk factors; risk status of the other registrants is unknown.

Even though the present study did not attempt to systematically evaluate the effect of the preexisting risk factors, information on the relative incidences of such problems in the OB Access project is valuable by itself. Previously, DHS did not have preexisting risk factor data for any of the populations served by MCH programs in California.

These and other clinical data were extracted from medical records by coders following the instructions in Appendix B. Since some of the data items are not relevant to the purpose of this report and are not discussed here, a review of these instructions and the medical data coding form will give the reader an idea of the scope of all demographic and clinical data collected on OB Access registrants.

Table 3

Mothers' Preexisting Risk Factors, Ranked by Frequency of Occurrence

Rank	Risk Factor Description	Occurrences	
		Number	Percent
	Total	16,770	100.0
1	Familial History of Disease or Abnormality	2,620	15.6
2	Language Barriers (Speaks, Reads, or Writes Little or No English)	1,454	8.7
3	Other Factors	1,302	7.8
4	Blood Dyscrasias	1,137	6.8
5	Cigarette Smoking	1,125	6.7
6	Gynecological Disorders	801	4.8
7	Stress	755	4.5
8	Chronic Renal or Kidney Disease	701	4.2
9	Prior Prenatal or Labor and Delivery Problems	567	3.4
10	Rh or ABO Sensitivity or Isoimmunization	554	3.3
11	Obesity	485	2.9
12	Chronic Lung Disease	426	2.5
13	Venereal Disease	374	2.2
14	Emotional, Psychological, or Nervous Disorder	366	2.2
15	Prior C-Section	361	2.2
16	Phlebitis. Varicosities	350	2.1
17	Cardiac Disease	312	1.9
18	Infant More Than 4,000 Grams or Large for Gestational Age	295	1.8
19	Low Birth Weight Infant (Less Than 2,500 Grams)	237	1.4
20	Drug Abuse (<u>Not</u> Including Marijuana or Alcohol)	207	1.2
21	Battered As A Child, Wife, Woman	199	1.2
22.5	Congenital Chromosomal Abnormalities	196	1.2
22.5	Preterm Infant Less Than 37 Weeks Gestation	196	1.2
24	More Than 5 Pregnancies (Including Current Pregnancy)	193	1.2
25	Alcohol Abuse	176	1.0
26	Marijuana Smoking	149	0.89
27	Mental Retardation	137	0.82
28	Neonatal Death (First 28 Days of Life)	134	0.80
29	Infant Death (Occuring During First Year)	128	0.76
30	Fetal Demise (After 20 Weeks Gestation)	121	0.72
31	Chronic Hypertension	117	0.70
32	Taking Other Medications	87	0.52
33	Prior Episiotomy	84	0.50

Rank	Risk Factor Description	Occurrences	
		Number	Percent
34	Chronic Liver Disease, Hepatitis	79	9.46
35	Thyroid Dysfunction (Hypo-or-Hyper)	77	0.46
36	Seizures, Convulsions, Epilepsy	73	0.44
37	Gestational Diabetes	52	0.31
38	Diabetes Mellitus	37	0.22
39	Taking Anticonvulsants	24	0.14
40	Cancer, Leukemia, Malignancies	21	0.13
41	Prior Neonatal or Infant Death (Age Not Specified)	19	0.11
42	Child Abuser	18	0.11
43	Collagen Vascular Disease	17	0.10
44	Taking Antihypertensives	7	0.04

Note: Up to five risk factors may have been identified for a given woman. the total number of occurrences, therefore, exceeds the number of registrants.

Percents are rounded independently and may not add up to total.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Disposition of Registrants

Figure 2 was constructed in order to show "what happened" to the 6,774 who registered in the project and which registrants were included in the final Matched Study Group. For example, the figure shows that 1,352 women withdrew from the project, while 5,422 completed care under OB Access. This is the first of four levels of branching that occurred before women could be identified to be included in the Matched Study Group. Because this figure is constructed to show what happened to women at each juncture, the percentage noted on each branch adds to 100 percent (e.g. 80.0 percent of the original registrants completed care in the project and 20.0 percent withdrew).

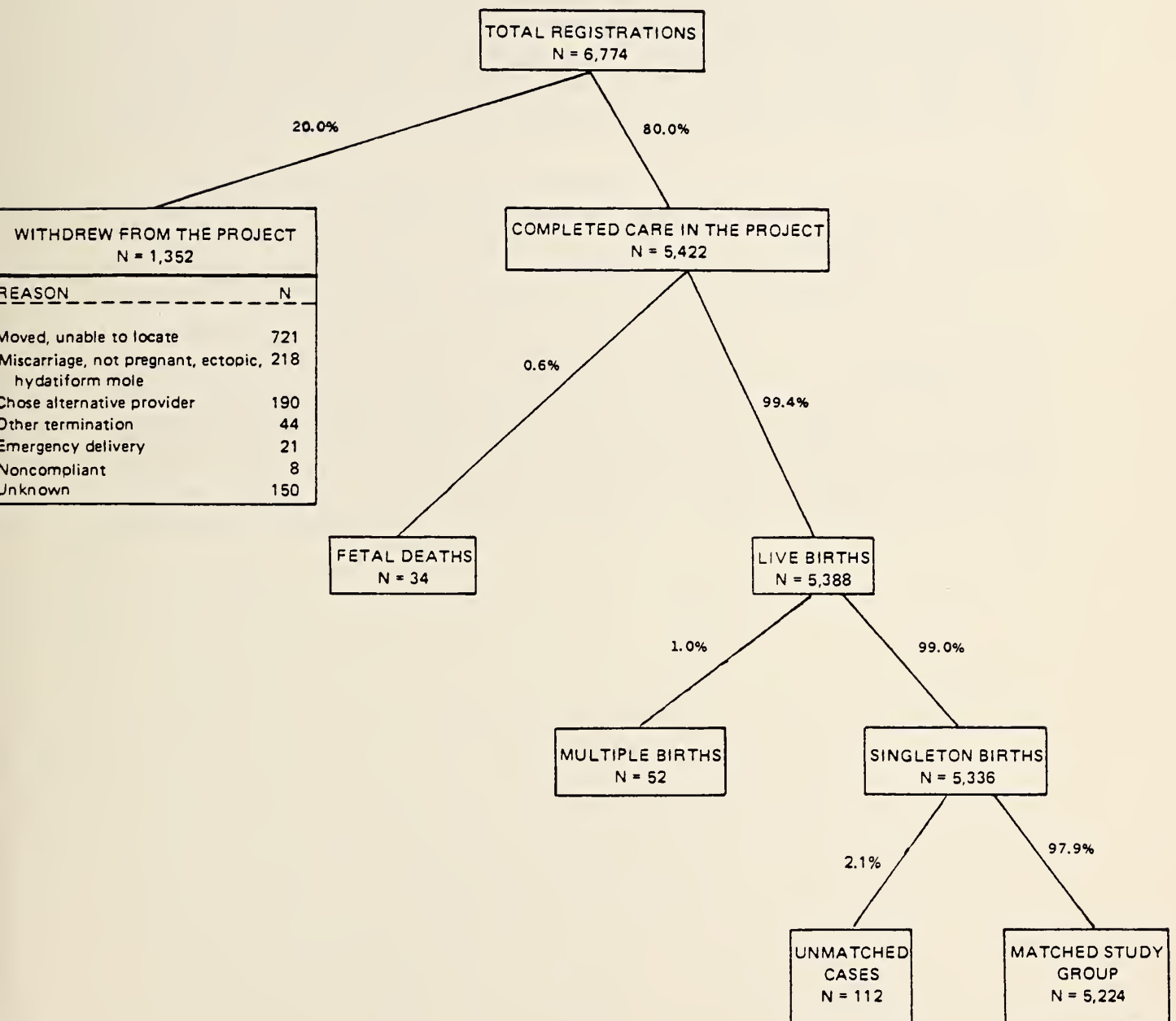
Four groups of primary interest are indicated by bold outline in the figure. The group of Total Registrations was profiled in the previous section and will be the subject of the next section discussing access to care. The group that completed care in the project (N = 5,422) will be the focus for much of the cost data presentation and analysis. The group of Live Births (N = 5,388) will be used in county-by-county comparisons with vital statistics data. The Matched Study Group (N = 5,224) will be used for the comparative analysis of birth outcomes between the OB Access project and Medi-Cal comparison cases from Vital Statistics files. The Matched Study Group includes those OB Access women who completed care in the project, had singleton live births, and could be matched with a "similar" Medi-Cal mother from the 1978 Vital Statistics file of single live births.

The other groups identified in Figure 2 will be discussed briefly in the remainder of this section. The reasons that the 1,352 women withdrew from the project are listed in the diagram. The majority (721) either moved away or failed to return for care and could not be located by project staff.

A significant number (218) had miscarriages, that is, lost their babies by the 20th week of gestation or were not pregnant; 190 others, after registering in the project, chose to complete care with another provider. Due to the particular coding scheme used, all those who did not deliver in the project and/or who miscarried before 20 weeks gestation were classified as withdrawals, even though some (e.g., those who miscarried) might have received care under OB Access throughout their pregnancies. Redefining these and similar cases as completing care would raise the project's completion of care rate to at least 84 percent.

FIGURE 2

DISPOSITION OF OB ACCESS REGISTRANTS



Of the 5,422 registrants classified as completing care in the OB Access project, 5,388 (99.4 percent) had live births. The other 34 cases were fetal deaths or stillborns at greater than 20 weeks gestation. Although this is a ratio of slightly over 6 fetal deaths per 1,000 live births -- which compares favorably to annual California statewide rates ranging from 8.2 to 8.7 per 1,000 during the term of the project -- this death rate should not be used to evaluate the impact of the OB Access project. The reason for this is twofold. First, from the outset, the evaluation design eliminated mortality statistics as outcome measures due to the problems involved in interpreting and testing the significance of small numbers. Second, adequate tracking mechanisms were not available to ensure that all fetal deaths were identified, especially among registrants who dropped out of the project. It is possible that other fetal deaths may have been included in some of the project withdrawals.

Of the 5,388 live births in the project, 5,336 (99.0 percent) were singleton births. One of the 52 remaining deliveries was triplets. The other 51 were twins. The multiple births are not included in the outcome analysis of this report, due in part to the small number involved and also to the unavailability of adequately matched comparison cases.

The final stage of categorization in Figure 2 distinguishes between those single live births (5,224 out of 5,336, or 97.9 percent) which were successfully matched to like cases in the Vital Statistics files and those which were unmatched (N = 112, or 2.1 percent). Of the 112 cases, 30 OB Access cases could not be used for comparison purposes because the baby's birthweight was missing. Other OB Access cases could not be matched due to missing data on match variables in the mother's medical records.

Research Question I

Can the OB Access Strategy improve access to maternity care for women in the target population?

There are many known but unquantified barriers to OB care, including financial, language, and cultural barriers and obstacles, such as transportation, weather, provider availability (e.g., number of providers, waiting time for appointment, clinic hours), patient awareness of medical services, and patient attitudes -- especially motivation. All of these impact on an individual's access to care. Because none of these barriers could be singled out for systematic study treatment within the OB Access Pilot Project, each was dealt with in different ways and with varying degrees of effectiveness by the individual OB Access contractors. In addition, there is a scarcity of data relating to problems women encounter in obtaining access to prenatal care.

This first research question is more conceptually complex than it would first appear. The notion of access to any health care services is a broad concept and contains five main elements: availability, acceptability, utilization, timeliness, and the financial ability of patients to gain access to services.

The availability of maternity services is implied by "access". Availability itself is not just the physical presence of maternity care providers, but also includes their willingness to see patients. Because the projects served geographic areas which were different from those for which health manpower data are collected, a strict comparison of the pre- and postpopulation health manpower ratios was not possible. Furthermore, there were other maternity care providers in addition to the OB Access providers in many of the areas. However, it is known that all projects were able to expand the level and amount of prenatal care services to their target populations.

Another approach to consider would be the pre- and postimpacts of the project and survey project mothers on how, what kind, and when they had sought prenatal care during their current and previous pregnancies. This was not agreeable to the project providers because of their limited resources and large workload. Hence, the project adopted a more restrictive approach to investigating that portion of the access question. For the purposes of the project, which focused on a special target group, availability was interpreted as the question -- could women who were seeking care from the contracted providers get it? This was translated into Research Hypothesis I-A.

Research Hypothesis I-A

Patient participation in the OB Access projects will meet or exceed 90 percent of allocated registrations for both Title V and Title XIX patients.

Title V patients are low income (up to 200 percent of poverty level) but non-Medi-Cal patients; Title XIX patients are Medi-Cal eligible. Due to the existence of these two standards of eligibility and the two funding sources, two separate contracts were written each year with every OB Access contractor. Allocated registrations were expressed as upper limits to the number of registrants and dollars available under each contract. These allocations or limits were based primarily on the contractors' own projections of the number of patients they hoped to serve, although availability of funds was also a consideration.

Several contracts were revised based on registration experience to increase the original allocation, so actual registration exceeded projections in some cases. Because the option of revising allocation limits upwards was not offered at the outset, the project contractors may have tended to overestimate in their projections in order to maximize their contract funding level.

The a priori standard of performance at the 90 percent level of registration under Hypothesis I-A was arbitrary. At this point, there is also little good data available to measure the number of underserved low income and Medi-Cal mothers in provider service areas. They serve areas that are different from county jurisdictions for which rudimentary data have been collected. As explained above, the contracted providers developed "guesstimates" of probable numbers of women they could serve. Whether they met or did not meet the 90 percent criterion level may have little relation to access issues, although factors such as the effectiveness of the contractors' outreach and publicity efforts are also important. Table 4 gives the registration levels for all contractors. The overall registration rate was 74.5 percent. Only two contractors met their overall registration targets.

TABLE 4

NUMBER OF WOMEN REGISTERED COMPARED TO CONTRACTORS'
PROJECTIONS FOR EACH FUNDING SOURCE
BY CONTRACTOR

CONTRACTOR	TOTAL			TITLE V FUNDING			TITLE XIX FUNDING (MEDI-CAL)		
	Number Registered	Number Projected ¹	Registered as Percent of Projected	Number Registered	Number Projected ¹	Registered as Percent of Projected	Number Registered	Number Projected ¹	Registered as Percent of Projected
Total	6,774	9,093	74.5	3,518	3,534	99.5	3,256	5,559	58.6
City of Berkeley	799	1,200	66.6	102	300	34.0	687	900	77.4
East Oakland	339	900	37.7	157	150	104.7	182	750	24.3
La Clinica	427	540	80.9	365	438	83.3	62	102	60.8
Santa Barbara	1,269	1,800	70.5	962	750	128.3	307	1,050	29.2
Sonoma Indian	122	450	27.1	39	90	43.3	83	360	23.1
United Indian	96	240	40.0	12	60	20.0	84	180	46.7
Clearlake Indian	152	750	20.3	178	186	95.7	140	564	24.8
Kings County	881	750	117.5	425	336	126.5	456	414	110.1
N. E. Rural Clinics	391	519	75.3	185	306	60.5	206	213	96.7
No. Calif. Coalition	121	321	37.7	43	99	43.4	78	222	35.1
San Diego	2,011	1,623	123.9	1,050	819	128.1	961	804	119.5

¹ Contracts were revised when appropriate to allow registrations to exceed the contract limits that were based on original projections.

Source: OB Access Contracts and OB Access Pilot Project Data Base (July 1979-June 1982).

Another issue was to determine what impact the program had in terms of the number and percentage of women in each county who received care under the OB Access project. Tables 5A and 5B show the total number of live births in each of the OB Access counties, the number of live births to OB Access registrants and also the total number of OB Access financed births, by Title V and Medi-Cal (Title XIX) funding, during the project's existence.

The data are reported for the three calendar years 1980, 1981, and 1982. Although project registration began in July of 1979, very few actual deliveries occurred during that calendar year. Similarly, although project registration ended on or before June 30, 1982, deliveries did occur in the six-month period from July 1 to December 31, 1982. Hence, for purposes of comparison, these three full calendar years are reported.

Table 5-A

All Live Births and OB Access Live Births
in OB Access Counties
1980-1982

County	Live Births		
	Total	OB Access Project	
		Total	Percent of County Births
Total State	1,250,001	5,388	0.43
Alameda	52,967	1,238	2.34
Humboldt	5,530	62	1.12
Kings	5,182	719	13.88
Lake	1,520	151	10.07
Lassen	1,110	176	15.86
Mendocino	3,584	97	2.71
Modoc	431	46	10.67
San Diego	97,146	1,601	1.65
Santa Barbara	10,849	967	8.91
Shasta	5,338	69	1.29
Siskiyou	2,040	44	2.16
Sonoma	14,011	96	0.69
Trinity	559	21	3.76
Other	1,049,734	101	0.01

Source: State of California, Department of Health Services, Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Table 5-B

OB Access Live Births by Funding Source
for OB Access Counties
1980-1982

County	Funding Source		
	Total	Medi-Cal	Title V
Total	5,388	2,575	2,813
Alameda	1,238	724	514
Humboldt	62	52	10
Kings	719	389	330
Lake	151	71	80
Lassen	176	115	61
Mendocino	97	29	68
Modoc	46	21	25
San Diego	1,601	748	853
Santa Barbara	967	228	739
Shasta	69	47	22
Siskiyou	44	8	36
Sonoma	96	67	29
Trinity	21	9	12
Other	101	67	34

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Table 6 indicates the percentage of all Medi-Cal financed births included in the OB Access project. The number of Medi-Cal births accounted for in the OB Access project ranged from 35.2 percent of all Medi-Cal births in Lassen County to 1.8 percent in Siskiyou County.

Table 6

Estimated Medi-Cal Live Births and OB Access Medi-Cal Live Births
for OB Access Counties
1980-1982

County	Live Births	Coefficient <u>1/</u>	Estimated Medi-Cal Financed Births <u>2/</u>	OB Access Medi-Cal Births	
				Number	Percent
Alameda	52,967	.2502	13,252	724	5.46
Humboldt	5,530	.3308	1,829	52	2.84
Kings	5,182	.3627	1,880	389	20.69
Lake	1,520	.3714	565	71	12.57
Lassen	1,110	.2949	327	115	35.17
Mendocino	3,584	.3141	1,125	29	2.58
Modoc	431	.2470	107	21	19.63
San Diego	97,146	.2300	22,344	748	3.35
Santa Barbara	10,849	.2430	2,636	228	8.65
Shasta	5,338	.3913	2,089	47	2.25
Siskiyou	2,040	.2146	438	8	1.83
Sonoma	14,011	.2222	3,113	67	2.15
Trinity	559	.2923	163	9	5.52
Other	N/A	N/A	N/A	67	N/A

1/ The coefficient is the weighted average proportion of the total live births paid for by Medi-Cal and is based on data from 1978, 1979, and 1980.

2/ Estimated Medi-Cal financed births are calculated by multiplying the county specific coefficient by the number of live births for each county for 1980-1982.

Source: State of California, Department of Health Services, Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Apart from the absolute number of women served in each of the counties, one of the major intended impacts was to increase access to care. Part of that concept implies that a higher percentage of Medi-Cal mothers in OB Access counties would receive complete and early care (i.e., care beginning in the first or second trimester). Table 7 shows the percentage of all women residing in OB Access counties who had inadequate prenatal care (i.e., care beginning in the third trimester, no care, and unknown care). These data were drawn from the birth certificates. Although there are problems with their reliability (see comment next page), they do indicate a general trend in the counties of interest. For all live births, including those of OB Access women, there appears to have been a reduction in the weighted average percent of inadequate prenatal care in all OB Access counties from 10.15 percent in 1978 to 5.49 percent during 1982. The statewide change during the same period was from 10.0 to 6.6 percent.

Table 7
Percent Inadequate Prenatal Care Live Births
in OB Access Counties
1978-1982

County	Year				
	1978	1979	1980	1981	1982
Statewide	10.00	8.80	7.20	7.10	6.60
Alameda	7.30	5.90	4.90	5.70	5.42
Humboldt	7.14	6.34	5.20	7.79	6.58
Kings	10.76	12.93	12.20	7.93	7.38
Lake	16.67	11.92	8.80	7.91	8.04
Lassen	9.52	7.40	4.90	18.82	3.89
Mendocino	6.75	11.15	13.40	10.67	7.87
Modoc	19.05	17.93	10.10	34.56	8.50
San Diego	6.86	7.08	5.30	5.10	4.50
Santa Barbara	9.47	6.08	4.50	4.76	3.26
Shasta	11.46	13.32	9.90	7.14	5.73
Siskiyou	7.45	6.42	4.30	22.83	8.25
Sonoma	8.57	9.07	7.50	6.17	5.33
Trinity	20.59	14.50	17.50	12.30	13.04
Weighted Average for OB Access Counties	10.15	7.71	6.38	7.02	5.49

Note: Inadequate prenatal care is defined as care beginning in the third trimester, no care, or care not reported.

Source: State of California, Department of Health Services, Birth Cohort File.

Because the number of OB Access live births in those counties represented only a small fraction of the total births, it is not possible to ascertain whether the OB Access project was directly responsible for the apparent reduction in the inadequate prenatal care rate.

A better comparison for the percent of inadequate prenatal care would have been to measure this percentage by county for Medi-Cal women alone, before implementing the project, then to remeasure during the project period. Although we have been able to measure these rates for the project period, the data available for 1978 (preproject) are questionable. The 1978 data are derived from the birth certificate; a recent study by Jamison ^{10/} found that month prenatal care began, as reported on the birth certificate, agreed with hospital medical records in only 37.2 percent of the cases sampled. Relaxing the criterion of agreement to onset of care within the same trimester resulted in only 70.4 percent agreement.

It is probable, therefore, that onset of care data for many of the Medi-Cal comparison cases may be erroneous and any comparison with OB Access data drawn from original medical records would be invalid. This same consideration precludes a meaningful comparison of onset of care between OB Access cases and those in the Matched Study Group used to test Hypothesis I-B in the next section. A reasonable way to circumvent this problem would be to capture the month prenatal care began for OB Access mothers from the birth certificate so the source of data would be the same. This was not practical because OB Access records were not linked to birth certificate records, nor could they be without manually searching birth files. This process was attempted, in fact, in order to recover missing birthweights, but only for several hundred OB Access cases. Even with the assistance of a computer prematch to reduce the search time, it was a lengthy manual process. The recovery of month prenatal care began from 124 of these birth certificates, along with the birthweights, allowed us to make the same comparison (with this nonrandom sample) that Jamison made with his sample. In 17.8 percent of the cases, agreement was found as to the month prenatal care began. Classifying by trimester raised the agreement level to 68.5 percent -- close to the level reported by Jamison.

Table 8 indicates the county of residence for Medi-Cal OB Access mothers by year. Table 9 shows the percentage of OB Access women by trimester when they began prenatal care -- 86.6 percent registered for their initial care during the first or second trimester, and 13.4 percent began care in the third trimester.

Given the lack of detailed data on the percentage of inadequate care prior to the project, the relative change cannot be evaluated. The 13.4 percent of OB Access patients who did not receive early care compares well with other projects with similar goals (see Table 10). The San Joaquin Perinatal Project (SJPP) had 20.4 percent, and the Oakland Perinatal Project (OPHP) had 12.6 percent of their patients beginning care in the third trimester of their pregnancy. Given the population that was served by the various contractors, the fact that 86.6 percent did get early care is encouraging.

Table 8

Live Births to OB Access Medi-Cal Women
in OB Access Counties
1980-1982
(by County of Woman's Residence)

County	Total	Year			
		1980	1981	1982	Other
Total	2,575	728	997	776	74
Percent	100.0	28.3	38.7	30.1	2.9
Alameda	724	256	244	168	56
Humboldt	52	26	25	1	0
Kings	389	134	133	117	5
Lake	71	7	27	37	0
Lassen	115	11	47	57	0
Mendocino	29	13	11	5	0
Modoc	21	6	10	5	0
San Diego	748	184	322	238	4
Santa Barbara	228	43	113	72	0
Shasta	47	4	18	22	3
Siskiyou	8	5	0	3	0
Sonoma	67	19	23	23	2
Trinity	9	7	2	0	0
Other	67	13	22	28	4

Note: Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Table 9

Live Births to OB Access Medi-Cal Women
 By Trimester Prenatal Care Began
 (by County of Woman's Residence)

County	Total	First or Second Trimester	Third Trimester
Total	2,575	2,230	345
Percent	100.0	86.6	13.4
Alameda	724	596	128
Humboldt	52	47	5
Kings	389	334	55
Lake	71	65	6
Lassen	115	111	4
Mendocino	29	28	1
Modoc	21	17	4
San Diego	748	649	99
Santa Barbara	228	216	12
Shasta	47	45	2
Siskiyou	8	6	2
Sonoma	67	55	12
Trinity	9	7	2
Other	67	54	13

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

Note: Prenatal care is defined as beginning when the patient registered in the OB Access program.

Table 10

Trimester of First Prenatal Visit for Registrants of
OB Access,
Oakland Perinatal Health Project (OPHP),
and San Joaquin Perinatal Project (SJPP)

Trimester Registrants Began Prenatal Care	OB Access		OPHP		SJPP	
	Number	Percent	Number	Percent	Number	Percent
Total	5,224	100.0	1,195	100.0	383	100.0
First (0-13 Weeks)	1,889	36.2	492	41.2	130	33.9
Second (14-26 Weeks)	2,663	51.0	441	36.9	175	45.7
Third (27 Weeks and Over)	672	12.9	150	12.6	78	20.4
Not Reported/Unknown	-0-	-0-	112	9.4	-0-	-0-

Note: Percents are rounded independently and may not add to total.

Source: OB Access Pilot Project Data Base (July 1979-June 1982); Oakland Perinatal Health Project Report, September 1982; and San Joaquin Perinatal Project Interim Report, June 1979.

The second factor to consider in assessing access to care is acceptability of the care. Acceptability encompasses the cultural setting and the way in which patients are treated. In the project, very precise contract language guaranteed basic patient rights, and the use of multi-lingual staff and materials, that were both understandable and culturally acceptable, were encouraged. Projects served ethnically diverse low income women, including White, Mexican American, Black, Native American, and Southeast Asian mothers. Each project fully complied with the contract requirements.

Another aspect of acceptability was that the State required a formal grievance process and a procedure for women withdrawing from the project. In no case did any withdrawing registrant give the reason as lack of acceptability of care. This may be evidence that OB Access project care received a high degree of acceptability. No specific research hypothesis was adopted for testing this aspect of access.

A third measure of accessibility is the actual utilization of services. It was determined that the percentage of those women who registered early in their pregnancy and who received full care would be a good measure of accessibility. Thus, the following hypothesis was adopted.

Research Hypothesis I-B

A greater proportion of OB Access Project patients will begin care during the first trimester of pregnancy than matched comparison cases from the Medi-Cal population.

Trimester prenatal care began may be obtained from California live birth certificates and is available in the MCH Birth Cohort file. Recent work on a linkage between 1978 Medi-Cal paid claims and the 1978 California live birth files enabled project staff to select Medi-Cal births in each OB Access county as comparison cases for statistical hypothesis testing.

Table 11

Trimester Women Began Prenatal Care
OB Access 1979-1982
Medi-Cal Match 1978

Trimester	OB Access		Medi-Cal Match	
	Number	Percent	Number	Percent
Total	5,224	100.0	5,224	100.0
1	1,899	36.2	3,215	61.5
2	2,663	51.0	1,511	28.9
3	672	12.9	366	7.0
Not Reported/ Unknown	-0-	-0-	132	2.5

Note: Percents are rounded independently and may not add to totals.

Source: State of California, Department of Health Services, 1978 Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

The results in Table 11 are problematic for testing the hypothesis. The apparent earlier onset of care for the Medi-Cal match group (61.5 percent first trimester care for the Medi-Cal match group versus 36.1 percent for the OB Access group) appears to refute the hypothesis. However, it should be noted again that the onset of care data for the OB Access group were taken from the actual medical records. Onset of care information for the Medi-Cal match group came from the 1978 live birth records. As mentioned in the previous section, birth certificate data were found to differ markedly from hospital records on this item. As shown in Table 10, the OB Access data appear to be very similar to other projects that used the same data collection technique. Hence, the reader might ask why these findings should be reported at all. It can only be said in mitigation that Hypothesis I-B was cast as stated in the original research design and, at this point, due to the differences discovered in the data collection methods, it is probably not a fair test of onset of care.

The next aspect of access is the comprehensiveness of prenatal care, given a timely onset. This idea is stated in the research hypothesis below.

Research Hypothesis I-C

Women who register in the first trimester of pregnancy will utilize the complete package of services offered by OB Access providers.

The complete package of services (full care) includes a minimum of eight prenatal exams, including a comprehensive initial exam, a psychosocial needs assessment, a health education needs assessment, a nutrition needs assessment, at least one birth education class, and a supply of prenatal vitamins. Table 12 indicates that, of the 2,072 women who started care in their first trimester of pregnancy, 1,360 (65.6 percent) received full care. For those who received their first care in the second trimester, 51.3 percent received full care; and for those who started in the last trimester, only 24.8 percent received full care. Hence, as one would suspect, the project data support the hypothesis that the earlier the onset of care, the greater the probability of full care being received.

Table 12

Number and Percent of Women Who Completed Care in the OB Access Project
by Trimester Prenatal Care Was Begun and Level of Care Received
1980-1982

Trimester Prenatal Care Began	Total	Level of Care		
		Partial	Full	
	Number			
	Total	5,422	2,504	2,918
	First	2,072	712	1,360
	Second	2,744	1,336	1,408
	Third	606	456	150
	Percent of Total			
	Total	100.0	46.2	53.8
	First	38.2	13.1	25.1
	Second	50.6	24.6	26.0
	Third	11.2	8.4	2.8
	Row Percent			
	Total	100.0	46.2	53.8
	First	100.0	34.4	65.6
	Second	100.0	48.7	51.3
	Third	100.0	75.2	24.8
	Column Percent			
	Total	100.0	100.0	100.0
First	38.2	28.4	46.6	
Second	50.6	53.4	48.3	
Third	11.2	18.2	5.1	

Note: Full care is defined as a minimum of eight prenatal exams (including a comprehensive initial exam), a psychosocial needs assessment, a health education needs assessment, a nutrition needs assessment, at least one birth education class, and a supply of prenatal vitamins.

Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-1982).

The final aspect of access is that of the woman's financial ability to obtain care. Due to the administrative mechanisms established by the project, any woman who originally registered as an OB Access patient, either as a Title V or Medi-Cal (Title XIX) patient, who wished to complete care was able to do so. Even with changes in the woman's financial and eligibility status for either Medi-Cal or Title V, it was possible to provide continuity of prenatal care. This aspect of the project was monitored by administrative means, and there is no evidence that, due to lack of financial resources, anyone was deprived of access to care. It was not considered necessary to develop a specific hypothesis because the program structure guaranteed financial access to prenatal care.

Research Question II -- Birth Outcome

Does the OB Access strategy improve the pregnancy outcome for women in the target population?

Research Hypothesis II-A

The proportions of very low birthweight (under 1,500 grams) and other low birthweight (1,500-2,499 grams) babies born to mothers who receive the full OB Access package of care will be less than the same proportions of low birthweight infants born to women in the Medi-Cal match group.

Research Hypothesis II-B

The proportions of very low birthweight and other low birthweight babies born to OB Access mothers who receive the full OB Access package of care will be less than the same proportions for OB Access mothers who receive less than the full range of OB Access services.

Research Hypothesis II-C

The proportions of very low birthweight and other low birthweight babies born to OB Access mothers who receive early (first trimester) prenatal care will be less than the same proportions for OB Access mothers who receive late (third trimester) prenatal care.

Background

Birthweight, gestational age, Apgar score, complications of pregnancy, complications of labor and delivery, postpartum problems, and mortality rates are all potential measures of pregnancy or birth outcome. Birthweight has been chosen as the primary measure for hypothesis testing in the present study for the following reasons.

Birthweight is more objective than gestational age, because the latter is based either upon a patient's recall of her last menstrual period (LMP) or upon a physical examination of the newborn -- a method which has been shown to be imprecise particularly in the earlier gestational ages. Further, estimation of gestational age depends on interpretation of physical findings and varies with different practitioners.

In addition to being somewhat subjective, Apgar score is influenced more than birthweight by labor, delivery, and immediate newborn events. Because we intend to study neonatal care costs (the third hypothesis in this study) which are also influenced by these events, results would be less informative than studying birthweight, which is unaltered by what transpires during labor, delivery, and the immediate newborn period.

Observations on other variables (complications of pregnancy, complications of labor and delivery, and the postpartum newborn problems and abnormalities, etc.) are too subjective and poorly reported in potential comparison data bases to be of use in formal hypothesis testing for the present study. Outcomes, such as maternal and neonatal mortality occur too infrequently for meaningful comparisons to be made with project data.

Finally, birthweight is one of the most consistently and accurately reported measures on birth certificates. Because data for OB Access cases is derived from patients' medical records and data for Medi-Cal match cases comes from birth certificates, a major concern is the comparability of data coming from two different sources. Jamison's study 11/ compared birth certificates and medical records for over 450 infants and found agreement within one ounce (28 grams) in 95.4 percent of the cases.

The hypotheses stated above are constructed using proportions of very low and low birthweight categories rather than actual numbers. Low birthweight correlates with high expected perinatal mortality rate, the incidence of certain newborn problems, and high neonatal care costs. Therefore, the proportion of low birthweight babies is selected as the most definitive statistic for evaluation purposes. It is more meaningful than other birthweight statistics such as average birthweight. A difference in average birthweight between study and comparison groups would not necessarily indicate a difference in health status between the groups, because small differences in birthweight are not meaningful for all weights. Specifically, differences within the normal range of birthweights have little impact on survival and little relation to newborn problems.

Procedures

The OB Access Pilot Project was conducted as a demonstration project with much of the emphasis on implementation, that is, developing an effective and cost-efficient system of delivering comprehensive prenatal care among existing providers. Randomized assignments of participants to study and control groups, pre- and postmeasures on key variables and other features of more controlled experiments were lacking. This is typical of demonstration programs and other social action research because of the many practical, organizational, ethical, and political considerations surrounding such research.

One particular problem with this approach for the present evaluation, however, is that potential differences in motivation and health behavior between OB Access and other groups (i.e., the Medi-Cal population in general and the Medi-Cal match group in particular) cannot be assessed. Such differences, if they exist, could influence the comparability of birth outcomes even in the absence of any effects attributable to the program.

Because the project design cannot adequately deal with these issues as they affect birthweight and other outcome measures, the weight of evidence presented in this evaluation must be judged in conjunction with one's assessment of the likelihood and potential magnitude of such confounding effects. The following brief discussion of several problem areas may assist the reader in making this admittedly subjective assessment.

First, OB Access providers engaged in outreach efforts and attempted to eliminate any identified barriers to care as part of the program's emphasis on access. All OB Access providers operated in underserved areas, and often were the only available providers in the areas. These factors make it less likely that only the most motivated women sought care from these providers.

Second, the 16 percent of project registrants who withdrew from the project pose a problem if they differ from those who completed care in any way that relates to pregnancy outcome. Attitude, motivation, socio-economics, psychosocial support, etc., are such potential differences. Unfortunately, the status and whereabouts of the majority of the withdrawals was unknown even to the clinics where they initially registered because they failed to return for visits or moved out of the area. Measurement of these variables or recovery of birth outcome would be difficult for these cases even if funding and staff were available at this stage of the evaluation.

Third, not all women registering in the project received the full scope of OB Access services as intended. While it would seem that the first step in conducting a fair test of the effectiveness of these services would be to eliminate those who did not actually receive the prescribed services from the experimental group, this procedure would introduce a bias in any comparison involving birth outcome. It could be argued that only the most motivated and health conscious of the registrants took advantage of all the services and that these women would normally have better birth outcomes. These characteristics were not measured directly during the project, so such potential differences cannot be identified. The fact that OB Access providers generally made every effort to provide the full scope of services and followed up missed appointments may have reduced the effect of motivation per se. Still, it would be difficult to determine what proportion of registrants failed to receive the full scope of services, due to lack of motivation or other barriers, and what proportion was due to random circumstances beyond the control of providers and patients.

Finally, in relation to those not receiving the full range of services, it is also likely that at least a proportion of these women failed to make the prescribed number of visits because they experienced preterm deliveries. Therefore, they also had low birthweight babies. Because the quantity and quality of data on gestational age made it difficult to define appropriate level of care (full care) relative to length of gestation on a case-by-case basis, a satisfactory correction for this phenomenon was not effected.

While the first two problem areas discussed above (a possible correlation between intrinsic motivation and project registration or completion of care) cannot be dealt with adequately within the project design, the last two areas of concern can be mitigated. Whereas Hypothesis II-A, as stated, was adopted in the original project design accepted by the sponsoring agencies a more conservative test is also put forth in the following pages. This involves a comparison of low birthweights between all OB Access mothers and their matched comparison cases.

Control for other factors known to be related to birthweight could be dealt with in the present evaluation by matching on these factors when drawing comparison cases from the Birth Cohort File (see Technical Note 1 in Appendix C for background on the Birth Cohort File). These included predisposing factors (race/ethnicity of mother, age of mother, and number of previous live births), as well as characteristics of the present birth (plurality and sex of infant). OB Access births were also matched with Medi-Cal births with the same county of residence, where possible, in an attempt to control for general environmental factors. Comparability on socioeconomic status was implicit in matching OB Access mothers, who were all low income women, only with Medi-Cal mothers from the Birth Cohort records.

The matching procedure required an exact match on race/ethnicity of mother (White, Black, Mexican American, American Indian, Other, or Unknown), number of previous live births, and plurality and sex of infant. Age of the mother was allowed to vary by plus or minus two years in matching. Number of previous live births was treated as a dichotomous variable (none versus one or more). Because it was one of the best reported pregnancy history items on the birth certificate, number of living children was used to determine previous births for Birth Cohort cases. For OB Access cases, number of living children was used if known, otherwise parity was used. Matching criteria were relaxed for county of residence, if necessary, so approximately 40 percent of the OB Access cases were matched with births from other counties. No attempt was made to judge the comparability of the counties on any predefined criteria.

Multiple births could not be matched adequately on these criteria because of the small number of twins and triplets. Only single live births, therefore, were used in hypothesis testing. As Figure 2 in the previous section illustrated, a match rate of 97.9 percent was achieved in matching single live births. This resulted in a Matched (Medi-Cal) Study Group with N = 5,224.

Results and Discussion

Table 13 presents the outcome data relevant to Hypothesis II-A. Of the 2,825 single live births to mothers who received the full package of OB Access services, only one (less than 0.04 percent) was in the very low birthweight (less than 1,500 grams) category and 86 (3.1 percent)

were in the low birthweight (1,500-2,499 grams) group. For the corresponding Medi-Cal match births, 38 (1.3 percent) were in the very low birthweight category and 180 (6.4 percent) were in the low birthweight group. These are dramatic differences which strongly support the hypothesis of improved birthweight outcome under the OB Access Project.

A chi-square statistic was computed to test the significance of these differences. Because the data are based on matched pairs, a table layout different from that in Table 13 was used to compute the statistic (see Technical Note 2 on chi-square tests in Appendix C). The resultant chi-square of 60.1 (df = 1) is highly significant.

Table 13

Birthweight Comparisons for Single Live Births
Between OB Access Infants Whose Mothers Had Received Full Prenatal Care
and Matched Medi-Cal Births

Birthweight in Grams	Full-Care OB Access <u>1/</u>		Medi-Cal Match	
	Number	Percent	Number	Percent
All	2,825	100.0	2,825	100.0
Under 1,500	1	a	38	1.3
1,500-2,499	86	3.0	180	6.4
2,500 or Over	2,738	96.9	2,607	92.3

a Less than 0.1 percent.

1/ Full care is defined as a minimum of eight prenatal exams, including a comprehensive initial exam, a psychosocial needs assessment, a health education needs assessment, a nutrition needs assessment, at least one birth education class, and a supply of prenatal vitamins.

Note: See Technical Note 2 in Appendix C for the test of significance. Although this table layout provides the best framework for the discussion in the text and the best visual display of the differences between the groups, a slightly different format is needed to compute the chi-square statistic for matched comparison cases.

Only single live born infants are included; twins, triplets, etc., are excluded.

Percents are rounded independently and may not add to totals.

Source: State of California, Department of Health Services, 1978 Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Results pertaining to Hypothesis II-B are contained in Table 14. Those OB Access mothers receiving the full scope of recommended services also showed superior outcomes than OB Access mothers receiving less than the full package of care. Specifically, 24 (1.0 percent) of the partial care recipients had very low birthweight infants compared to the one case reported for those receiving full care. Similarly, 133 (5.5 percent) of the partial care recipients had outcomes in the low birthweight range compared to 86 (3.1 percent) for the full care recipients. These differences, also highly significant with a chi-square of 46.2 (df = 2), support the stated hypothesis.

Table 14

Birthweight for Single Live Births for OB Access Infants
by Mother's Level of Care
1980-1982

Birthweight in Grams	Full-Care <u>1/</u>		Partial Care	
	Number	Percent	Number	Percent
All	2,825	100.0	2,399	100.0
Under 1,500	1	a	24	1.0
1,500-2,499	86	3.0	133	5.5
2,500 or Over	2,738	96.9	2,242	93.5

Chi-square = 46.2, df = 2 (p < .001)

a Less than 0.1 percent.

1/ Full care is defined as a minimum of eight prenatal exams (including a comprehensive initial exam), a psychosocial needs assessment, a health education needs assessment, a nutrition needs assessment, at least one birth education class, and a supply of prenatal vitamins.

Note: Only single live born infants are included; twins, triplets, etc., are excluded.

Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

The results above show that OB Access group babies whose mothers received full care had a significantly lower incidence of low birthweight than those babies whose mothers were identified with the comparison groups of Hypotheses II-A and II-B. The fact that the OB Access full care group had only 87 infants weighing less than 2,500 grams and the matched Medi-Cal group had 218 low birthweight infants for the same number of live births (N = 2,825) argues strongly for the effectiveness of the OB Access program of prenatal care. These numbers indicate that the OB Access package of care, fully delivered to Medi-Cal low income women, could reduce the incidence of low birthweight by as much as 60 percent.

Table 15

Birthweight Comparisons for Single Live Births for OB Access Infants
Whose Mothers Received Early Prenatal Care and Late Prenatal Care
1980-1982

Birthweight in Grams	Early Care <u>1/</u>		Late Care <u>2/</u>	
	Number	Percent	Number	Percent
All	1,988	100.0	591	100.0
Under 1,500	9	0.5	5	0.8
1,500-2,499	84	4.2	20	3.4
2,500 or Over	1,895	95.3	566	95.8

Chi-square = 2.1, df = 2 (not significant)

1/ Early care is defined here as registration in the OB Access project during the first trimester of pregnancy.

2/ Late care is defined as registration in the OB Access project during the third trimester of pregnancy.

Note: Only single live born infants are included; twins, triplets, etc., are excluded.

Percents are rounded independently and may not add to totals.

Source: OB Access Pilot Project Data Base (July 1979-June 1982).

The statistical test associated with Table 15 is not significant (chi-square = 2.1).

Unlike the previous two hypotheses, Hypothesis II-C does not receive support from the results presented in Table 15. Of the 1,988 OB Access mothers who commenced care early by registering during the first trimester of pregnancy, 4.7 percent had birthweights under 2,500 grams. Of the 591 who began care late (in the third trimester), 4.2 percent fell into this birthweight group.

At this juncture, several factors that could compromise the validity of this conclusion should be assessed and discussed. These include (1) uncontrolled self-selection/motivation variables, (2) biases due to missing birthweights, and (3) noncomparability of data bases.

The first item was discussed earlier. Assuming prenatal care under the OB Access program was sufficiently accessible to all eligible women, then patients essentially self-selected themselves into the project and into the full care group. This self-selection could be due to motivation (or knowledge) factors which are also related to general health-seeking behavior and health status. Enhanced pregnancy outcome, therefore, could be due in part to differences between the OB Access full care group and other groups because of these factors, rather than the "experimental treatment" (i.e., participation in the OB Access project with the receipt of full care). Unfortunately, this cannot be assessed directly in the current demonstration project as was concluded in the earlier discussion. (See Research Question II, Procedures.)

By combining those OB Access patients who did not receive the full package of services with those who did, however, we can replace Hypothesis I-A with a more conservative test of the program's effects.

Table 16
Birthweight Comparisons
Between OB Access and Matched Medi-Cal Single Live Births

Birthweight in Grams	OB Access 1980-1982		Medi-Cal Match 1978	
	Number	Percent	Number	Percent
All	5,224	100.0	5,224	100.0
Under 1,500	25	0.5	68	1.3
1,500-2,499	219	4.2	300	5.7
2,500 or Over	4,980	95.3	4,856	93.0

Note: See Technical Note 2 in Appendix C for the test of significance. Although this table layout provides the best framework for the discussion in the text and the best visual display of the differences between the groups, a slightly different format is needed to compute the chi-square statistic for matched comparison cases.

Only single live born infants are included; twins, triplets, etc., are excluded.

Percents are rounded independently and may not add to totals.

Source: State of California, Department of Health Services, 1978 Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Table 16 shows birthweight comparisons for all OB Access infants and the matched Medi-Cal cases (N = 5,224). OB Access mothers had 244 births (4.7 percent) in both low birthweight categories combined, while Medi-Cal patients had 368 births (7.0 percent) in these categories. This difference is significant (see Technical Note 2 on chi-square tests in Appendix C). This implies a 33 percent reduction in low birthweight under the OB Access program. The results of Table 16, then, may represent more closely what would be the average experience for those completing care in an OB Access type program. Mothers, other than the seemingly most motivated and health conscious, are represented. Also, some mothers received less than the maximum level of services available, which parallels what would most likely happen in actual practice. To the extent that future programs can bring the full package of care to more women -- more than the 54 percent (2,825 out of 5,224) in the current project -- then the results may even improve over this level.

The second factor which could compromise validity arises from those OB Access cases which could not be included in the analysis because the birthweight was unknown. Birthweight was not available originally from OB Access records for 260 infants. One could speculate that one of the reasons birthweight might be missing was that the infant had a low or very low birthweight and required immediate transport or neonatal intensive care. This reasoning implies that the missing birthweight cases include an unusually high proportion of low birthweight infants whose exclusion from analysis would bias the results.

Intensive follow-up by OB Access contractors, a lengthy computer search, and manual search of birth certificates by project staff recovered nearly 90 percent of the missing weights. Only 34 infants were excluded from the analysis due to missing data on this item. Most importantly, 2.1 percent of the cases recovered were very low birthweight (under 1,500 grams) and 8.2 percent were in the 1,500-1,499 grams category. Even though these percentages are somewhat higher than average, they demonstrate that the birthweights for the 34 cases excluded from analysis, if recovered, would not alter the findings.

The third factor which could compromise the validity involves two aspects of the comparability between the data bases. First, the OB Access birthweight data were derived from medical records, while the Medi-Cal match birthweights were obtained from birth certificates. Although these sources are different, the Jamison Study 12/ cited earlier in this section demonstrated close agreement (within one ounce for over 95 percent of the records compared) between these two sources. Second, OB Access project births occurred primarily during the 1980, 1981, and 1982 calendar years, while the Medi-Cal match births all occurred in 1978 because this was the only year with a Medi-Cal indicator in the live birth records. Any overall improvement in the incidence of

low birthweight over the time span of the project, therefore, would not be reflected in the Medi-Cal comparison group but would be reflected in OB Access statistics. Examination of statewide live birth data (see Table 17) indicates that in 1980, 1981, and 1982 the percent of low birthweight infants fluctuated between 5.8 and 5.9 percent -- a slight drop from 6.3 percent in 1978. Although the time factor may have influenced the results slightly, the improvement over time is small compared to the 33 to 60 percent improvement seen in the OB Access groups.

Table 17
Percent of Low Birthweight Live Births
in California
1978-1982

Year	Percent Low Birthweight
1978	6.3
1979	6.1
1980	5.9
1981	5.8
1982	5.9

Note: Low birthweight is defined as under 2,500 grams.

Source: State of California, Department of Health Services, Birth Cohort File.

Supplemental Comparisons

The foregoing analysis, testing the variants of Hypothesis II, was intended as the primary evaluation of the OB Access project's impact on pregnancy outcome. One additional set of comparisons, however, can provide additional perspective on the extent of the project's impact. Two earlier projects in California, OPHP and SJPP (see page 27), were also directed at improving pregnancy outcome among low income women.

Information presented in Appendix D provides a background on the similarities and differences between the OB Access project and these earlier projects. These differences, as well as possible differences in reporting, preclude any statistical interpretation of differences in low birthweight among the projects. Nevertheless, it is interesting to compare the data presented in Table 16 with results reported for the earlier projects 13/. Of the birthweights reported, 5.8 percent in OPHP were low birthweight (under 2,500 grams), while 8.2 percent in SJPP were low birthweight. The incidence of low birthweight reported in Table 16 for the OB Access project was 4.7 percent.

Research Question III -- Financial Aspects

Are additional expenditures on prenatal services, including comprehensive services, offset by savings in the cost of maternal and neonatal medical care during the period immediately following delivery?

Research Hypothesis III

Combined prenatal and postpartum/neonatal care costs for OB Access Medi-Cal mothers and babies will be less than the same costs for a sample of Medi-Cal comparison cases.

Discussion

The OB Access package of care covers a greater scope of prenatal services than the Medi-Cal package. The additional expenditures for prenatal care under OB Access may mean a reduction in costs for mother and newborn inpatient days and admissions to Neonatal Intensive Care Units (NICUs). While OB Access prenatal care costs were expected to exceed the Medi-Cal global fee for maternity care, the increase may be offset by lower postpartum and neonatal care costs for OB Access patients. A lower combined cost for OB Access cases would suggest that additional expenditures on well-planned antepartum care (beyond standard Medi-Cal benefits) are fiscally justified as part of effective health care during the prenatal period.

The process of maternity care normally covers a period from the point of conception through the prenatal phase to delivery and the postpartum period. For the purposes of this study, the period of interest was defined as the period from 45 weeks prior to the baby's date of birth to 8 weeks subsequent to birth. It was felt that this period would capture the majority of expenditures that were associated with the birth. Only data for women who delivered live born infants was used in this analysis. The one element that is excluded by these time brackets is the period from the 9th to the 52nd week postpartum. During this period, it is known that costs are incurred that can relate to the pregnancy and delivery (e.g., extended NICU costs and postdelivery sequelae for the mother). It was not possible to capture these data in this study. However, it can be postulated that the majority of the expenses for care occur during the period studied here.

Other expense data that were not captured were the personal out-of-pocket expenses that were incurred by the family for care to the mother or infant. Due to the requirements of confidentiality, these data could not be collected. It is believed that these expenses were not great and, because the focus of the study was the expenditures from public funds, these data were not relevant to our inquiry.

Procedures

The expenditure data that were used came from two main sources (see Technical Note 3 of Appendix C). The first was the OB Access Claims Unit. These financial data were recorded and coded on the final billing document that the contractor submitted after all care was completed for a given patient. Contractors were generally paid for all prenatal care services they provided, including the basic prenatal services, and the supplementary prenatal services that were given to women who needed additional services such as nutritional visits in excess of the basic OB Access package. In most cases, the OB Access Claims Unit paid for the professional delivery component. This data base covers both Medi-Cal and Title V women. The primary purpose of this data base was to collect project registration medical information. Hence, this file had full medical information even when only partial expenditures had been reimbursed. The cost of hospitalization was not a benefit for the Title V OB Access mothers and, hence, all Title V patients are excluded from this analysis and discussion.

The second data base is the Medi-Cal Claims Detail Report of the Medi-Cal Management Information System (MMIS). This data base was needed to identify and collect information on pregnancy related expenses that the project did not pay for directly; hospital costs are one example of this. Due to some local variation in billing practices, a few contractors chose not to bill for the physician component of the delivery.

Because the Medi-Cal claims covered all services provided, an algorithm was developed to select those claims which related to perinatal care for the mother or infant. The selection parameters were as follows: A claim was selected if (1) it contained a payment amount, (2) it fell in the period from 45 weeks prior to delivery to 8 weeks following delivery, and (3) it contained services that had ICDA codes that were maternity care related. Methodologically, it could be argued that claims with other nonmaternity ICDA codes should be considered as pregnancy related. As a matter of practicality, this would have required retrospective review of 3,200 clinical records and charts with the reviewer second-guessing whether the claim was related to pregnancy. Such resources were not available to the project. The data from the Medi-Cal files was merged with the OB Access claims file, using the Medi-Cal ID number. The resultant data set covered all pregnancy related costs for 1,254 OB Access Medi-Cal women for the project period.

Organization or Expenditure Data

This section is divided into three parts. Part 1 gives the descriptive information, part 2 conducts a comparison of the expenditures between the OB Access patients and the 1978 price-adjusted Medi-Cal matched groups, and part 3 investigates the probable expenditures and savings impact if the OB Access project were developed statewide.

Part 1 -- Descriptive Data on Expenditures

This section provides descriptive tables for the OB Access Medi-Cal mothers and examines various aspects of the expenditures associated with the provision of services to these women under the program. Each table or series of tables is accompanied by a brief narrative interpretation.

The data cover such items as the total expenditures by contract by year, the expenditures by infant birthweight group, and the expenditures by whether a woman received full or partial prenatal care.

Expenditures by Contractor by Year

Table 18 shows the mean expenditure by contractor by year. Mean expenditures for prenatal, delivery, and postpartum care differed by project; the highest was for East Oakland (\$4,261.50) and the lowest for Kings County (\$2,023.51). The weighted average expenditures for the urban-based projects were \$3,498.82 (Berkeley, East Oakland, La Clinica, and San Diego), while the weighted average expenditures for the rural projects were \$2,360.84. Several reasons for the difference may be postulated. The 48.2 percent higher expenditures for the urban projects may be a reflection of the higher hospital costs for those areas. In addition, the weighted average length of stay for women receiving prenatal care from urban contractors was 6.67 days, and 5.73 for the rural group. Hence, the shorter length of stay for the rural group could also explain the differences in expenditures.

The interproject differences in the average length of stay ranged from a high of 8.67 days for Sonoma Indian to a low of 4.93 days for Santa Barbara County. It should be noted that this refers to the combined inpatient days for mother and infant.

OB Access funds covered prenatal care including the physician delivery costs; Medi-Cal costs reflect mainly hospitalization. The weighted average of OB Access expenditures for urban providers was \$850.50, and \$854.55 for rural. The weighted average for Medi-Cal expenditures was \$2,607.12 for women who received prenatal care from urban contractors, and \$1,447.20 for rural contractors. The differences between the groups appear to be explained by the longer length of stay for women and infants served by urban contractors and the higher urban hospital costs.

Table 18

Mean Expenditures and Length of Stay
for OB Access Registrants
by Urban and Rural Contractors

Contractor	Number of Women	Mean Length of Stay <u>1/</u>	Mean Expenditures <u>1/</u>		
			Total	Medi-Cal	OB Access
Total	1,254	6.29*	\$3,038.67*	\$2,166.31	\$ 872.35
Urban	746	6.67*	3,498.82*	2,607.12	850.50
City of Berkeley	280	8.13	4,051.34	3,287.59	763.75
East Oakland	82	7.40	4,261.50	3,589.68	671.81
La Clinica	22	7.23	3,900.03	2,925.38	974.64
San Diego	362	5.35	2,876.38	1,926.03	950.35
Rural	508	5.73*	2,360.84*	1,447.20	854.55
Santa Barbara	118	4.93	2,225.86	1,332.14	893.72
Sonoma Indian	6	8.67	2,950.55	1,938.63	1,011.92
United Indian	37	6.57	2,291.52	1,435.95	855.57
Clearlake Indian	20	5.50	2,057.35	1,268.69	788.66
Kings County	220	5.43	2,023.51	1,163.30	860.21
NE Rural Clinics	83	6.83	3,297.11	2,262.01	1,035.10
Norcal Coalition	24	6.75	3,104.15	2,045.76	1,058.40

* Weighted Average

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Expenditures for Full and Partial Care Groups

The next table, Expenditures by Extent of Care, shows some interesting results. One would expect that the cost of services for women who received the full care package would be greater than for those who only received partial care (eight visits or more versus less than eight visits). As shown in Table 19, the mean total expenditure for women who received full care was \$3,022.97, which is \$34.60 less than for women who received partial care (\$3,057.57). This finding is unexpected; however, when one considers the implications of partial care as discussed earlier (see Table 14), the poorer outcomes imply higher expenditures and the data tend to substantiate this.

If one examines the average length of stay for the two groups, the women receiving full care had an average of 6.19 days versus 6.49 days for women receiving only partial care. The average length of stay was one-third of a day higher for the partial care group and is indicative that partial care can result in higher length of stay and higher overall expenditures for care.

Table 19

Expenditures for OB Access Medi-Cal
Patients by Extent of Care

Extent of Care	Number of Women	Length of Stay	Expenditures		
			Total	Medi-Cal	OB Access
Total	1,254	6.29	\$3,038.67*	\$2,166.31*	\$872.35*
Partial Care	569	6.42	3,057.57	2,244.54	813.03
Full Care	685	6.19	3,022.97	2,101.34	921.63

* Weighted Average

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Birthweight and Total Expenditures

The focus of the OB Access program was to decrease the percent of low birthweight infants born to women who received prenatal care under the project. OB Access was very successful in achieving this, but it is also important to examine the relationship between pregnancy related expenditures and low birthweight using this data set. As Table 20 shows, there is a clear relationship between birthweight and expenditure. The mean total expenditure for normal birthweight infants (2,500 grams and over) and their mothers was \$2,803.98. Expenditures for the 1,500-2,499 grams group (low birthweight) was \$5,669.79. For the very low birthweight group (less than 1,500 grams), the mean expenditure was \$14,944.02. Although these findings substantiate previous work by other researchers, the costs of the very low and low birthweight categories is lower than previously reported results.

There are three possible explanations for the relatively lower OB Access cost figures. The first is that the number of observations for both low birthweight groups is relatively small. Previous studies had a much larger sample of low birthweight groups. The smaller number of infants could result in a bias in the cost data reported here. The second explanation could be that, due to better prenatal care and earlier problem identification, the residual morbidity of OB Access low birthweight infants was less serious than that found in other studies. Another possible explanation might be the difference in hospital costs.

The average length of stay for mothers and infants for the very low, low, and normal birthweight groups were 24.80, 11.69, and 5.86 days, respectively. The very low birthweight group has an average which is almost 19 days or 423 percent higher than the normal birthweight group. The mean expenditures for the former group are 533 percent higher than for the latter (\$14,944.02 versus \$2,803.98). The average length of stay for all patients was 6.30 days. No comparable data have been found on length of stay from other studies.

The last comment on this data set is that for infants under 1,500 grams. OB Access expenditures were less than for the other two birthweight groups -- 73.6 percent of the mean amount. This provides additional evidence of the relationship between inadequate prenatal care and birth outcome. The mean expenditures for prenatal care for normal birthweights was \$876.63.

Table 20

Expenditures for OB Access Medi-Cal
Patients by Birthweight of Infant

Birthweight (grams)	Number of Women	Length of Stay	Expenditures		
			Total	Medi-Cal	OB Access
Total	1,254	6.30	\$ 3,043.44	\$ 2,170.72	\$872.72
Under 1,500	10	24.80	14,944.02	14,301.96	642.05
1,500-2,499	62	11.69	5,669.79	4,834.16	835.63
2,500 and Over	1,177	5.86	2,803.98	1,927.35	876.63
Unknown	5	N/A	N/A	N/A	N/A

N/A Not applicable.

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Expenditure by Age of Mother

The mean total expenditure for prenatal, delivery, postpartum, and neonatal care was \$3,040.72 for all 1,252 Medi-Cal OB Access women considered here. The mean cost of care ranged from \$2,693.66 for women 18 to 19 years of age, to \$3,270.89 for women under 18. The women, 20 and over, were divided into two groups, 20 to 34, and 35 or older. The mean costs for these two groups are within \$100 of each other -- \$3,076.76 for the 20 to 34 year-old women, and \$2,981.52 for women 35 and over.

The average length of stay was 6.30 days for all women and varied from 6.01 days for 18 to 19 year-old mothers and their infants to 6.65 days for mother 35 and over.

The average length of stay was also high for mothers under 18 years of age -- 6.59 days. However, women 35 and older had higher OB Access prenatal care charges than the women under 18 (\$897.36 versus \$817.03), but their Medi-Cal hospitalization costs were much less (\$2,084.16 versus \$2,461.86).

Table 21
Expenditures for OB Access Medi-Cal
Women by Age of Mother

Age of Mother	Number of Women	Length of Stay	Expenditures		
			Total	Medi-Cal	OB Access
Total	1,252	6.30	\$3,040.72	\$2,167.56	\$873.16
Under 18	150	6.59	3,278.89	2,461.86	817.03
18 to 19	184	6.01	2,693.66	1,829.24	864.42
20 to 34	866	6.28	3,076.76	2,193.47	883.29
35 and Over	52	6.65	2,981.52	2,084.16	897.36

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Expenditures by Trimester Prenatal Care Began

The data in Table 22 show that women beginning prenatal care in the third trimester have greater mean total care expenditures than other women. The total expenditures for women beginning care in the third trimester was \$3,182.34 or 6.4 percent higher than for women beginning care in the second trimester, and 5.0 percent higher than for women beginning care in the first trimester.

The differences between the components of care show that the mothers starting care in the third trimester had 12.9 percent higher hospital costs (\$2,395.25) than mothers starting in the first trimester (\$2,119.82), although the prenatal care costs for the first trimester women were 15.8 percent higher than for the third trimester group (\$911.51 versus \$787.09). However, the net difference in the mean total expenditure was \$151.81 -- the first trimester group being less expensive overall. This finding substantiates one of the basic premises of prenatal care that although early prenatal care does cost more, the net impact is to reduce the total expenditure; in this case, it did so by 5.0 and 6.4 percent (see previous paragraph).

Data on length of stay from this table show a consistent relationship between onset of care and length of stay. Those women who began care in the first trimester had an average length of stay of 6.12 days, 8.7 percent lower than those women who started care in the third trimester.

Both of these findings are important from a policy perspective and do indicate the importance of early, appropriate, and adequate prenatal care services.

Table 22

Expenditures for OB Access Medi-Cal
Women by Trimester Prenatal Care Began

Trimester Prenatal Care Began	Number of Women	Length of Stay	Expenditures		
			Total	Medi-Cal	OB Access
Total	1,252	6.30	\$3,038.35	\$2,165.90	\$872.44
First	352	6.12	3,031.33	2,119.82	911.51
Second	666	6.26	2,990.06	2,106.92	883.14
Third	240	6.65	3,182.34	2,395.25	787.09
Unknown	4	N/A	N/A	N/A	N/A

N/A Not Available.

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Expenditures by Race/Ethnicity of Mother

These data are important in examining the special health needs of individual ethnic groups. Black mothers had a mean total expenditure of \$4,130.89, which was 35 percent higher than the mean for all groups. The Medi-Cal paid inpatient expenses for these women were 54.5 percent higher than the overall mean. However, the amount paid by OB Access for prenatal care was 13.6 percent lower than the mean for all patients. Black women, as a whole, give birth to a higher percent of low and very low birthweight infants than women in other ethnic groups and, therefore, early, comprehensive prenatal care is probably very important for this ethnic group. From the OB Access cost figures, it is apparent that Black women in this Medi-Cal group may not have received the same amount of care as women in other ethnic groups. This indicates that either they did not begin care as soon as other women or they only received partial rather than full care.

The second main comment on the expenditures by ethnicity is that the Mexican American mothers had a mean expenditure that was 15.7 percent lower than for all groups. Their inpatient expenditures are 22.4 percent lower than for all groups, while their OB Access paid (prenatal care) expenses are 1 percent above the average.

The final comment on this table is that the average length of stay for the Black mothers is 25 percent higher than all groups.

Table 23

Expenditures for OB Access Medi-Cal
Women by Race/Ethnicity of Mother

Race/Ethnicity	Number of Women	Length of Stay	Expenditures		
			Total	Medi-Cal	OB Access
Total	1,252	6.35	\$3,059.24	\$2,183.35	\$875.89
White	456	5.79	2,831.36	1,897.60	933.76
Black	271	7.94	4,130.89	3,373.52	757.37
Mexican American	293	5.87	2,580.01	1,696.03	883.97
American Indian	41	8.00	2,948.82	2,058.30	890.53
Other	144	5.63	2,770.66	1,875.59	895.07
Unknown	47	N/A	N/A	N/A	N/A

N/A Not Available.

Source: OB Access Pilot Project Data Base Expenditure Data (July 1979-June 1982).

Part 2 -- Comparison of OB Access Data With Medi-Cal Matches

One of the important aspects of the study is to examine how the expenditures for OB Access project patients compare with a comparable group of non-OB Access Medi-Cal patients. This aspect of the study proved to be the most difficult. The first problem was to find a suitable group of patients from the Medi-Cal population who had similar characteristics to those in the study group.

The desired control group would have been a sample of Medi-Cal women drawn from the same counties and delivering during the same period as the project women. The State of California does not record birth outcome data in its Medi-Cal paid claims data base; hence, there is no way to link the Medi-Cal expenditure information and the patient medical data for this time period. The only linkage that has been made is for 1978 data under a special two-year project. The OB Access project was faced with the option of exploring alternative nonconcurrent methods of developing a comparative Medi-Cal group of women.

Several other problems became evident during this effort. It was found that 46.7 percent of all Medi-Cal women had two or more Medi-Cal ID numbers during the course of their pregnancy. For the project patients it was possible through manual sorting of original patient records to capture these second ID numbers; however, we did not have the ability to access the original medical records and find the missing ID numbers for the Medi-Cal comparison group. The State has become aware of this shortcoming in the system and, in 1982, instituted a linkage system to track all ID numbers for any Medi-Cal beneficiary. Based on the multiple Medi-Cal ID problem, there was serious underreporting of the total expenditures for Medi-Cal women. On investigating the OB Access Medi-Cal cases, it was found that on the average, 18.6 percent of the total claim was billed under the second or subsequent Medi-Cal numbers.

We then attempted to use the 1978 linked Birth Cohort File for the purpose of developing a comparison group. Because Medi-Cal expenditure data was not included in this file, this approach had to be abandoned.

A second effort was made using the Medi-Cal AIDS (see Technical Appendix) file which contains a nonrepresentative sample of all Medi-Cal paid claims for 1978. This effort enabled us to draw a sample of Medi-Cal patients in the OB Access counties for the year prior to the operation of the project. Two major problems existed with this data set. First, the expenditure amounts that were retrieved using the same algorithm as for the OB Access data were based only on one Medi-Cal ID number because, for women with two or more Medi-Cal numbers, the missing one could not be obtained. The second problem was that these data had to be price adjusted to the project years. A Medi-Cal specific maternity care price index was built to adjust the 1978 data to 1979-82. The problem with an index of this nature is that it must be statewide and, because the components of maternity care expenditures are affected by specific hospital costs, it could not reflect the actual cost changes.

An associated problem is that due to changes in the method of care during the period (i.e., increased use of more expensive neonatal intensive care services), the proportion of the total expenditures going to hospital care increased more than was reflected by the index. Hence, the adjusted expenditures undermeasured the actual comparative expenditures.

The third and most important difficulty comes from the mix of diagnoses of both the OB Access and comparison groups. The relatively rare but very expensive diagnoses that require prolonged hospitalization can and do skew the expenditure distribution dramatically. When we controlled for diagnosis type, there appeared to be no statistical difference in the mean expenditures for both groups; however, because of the small sample size (569) and our inability to obtain a 100 percent diagnosis match from the OB Access group and the Medi-Cal sample group, it was not possible to test this hypothesis.

A definitive test of the hypothesis could not be made given the data limitation of a comparative Medi-Cal group. With the development of the Medi-Cal ID linkage system in 1982, part of the problem may have been solved. But the problem of how to obtain patient specific information for Medi-Cal mothers from the general population will still exist. Hopefully, there will be efforts by the Department of Health Services to link Vital Statistics records and Medi-Cal claims for future years.

In conclusion, the researchers, after considerable debate, came to the conclusion that to report the results of the comparison studies would be methodically flawed because of the weakness of the data for the Medi-Cal comparison group. Due to the low incidence of certain diagnosis types, any future comparison will have to have a very large sample size because the impact of a few very expensive but fortunately low-incidence diagnoses can skew the distribution considerably.

In the matter of the relative expenditures of the two approaches (comprehensive prenatal care versus more expensive hospital care following birth), one is forced to consider more empirical conclusions. If the percent of low birthweight is reduced from 7.1 percent to 4.7 percent, then one can conclude that there must be some associated reduction in total expenditures.

Part 3 -- Economic Implications Statewide

Access to Obstetrical Care by Low Income Populations

The percent of low birthweight infants born to OB Access women was 4.7 percent, compared to 6.2 percent statewide. A Medi-Cal comparison group, selected by matching on five variables with the 1978 Birth Cohort File, had 7.1 percent low birthweight. Given the matching process and the total number of infants, it is fair to say that the smaller percentage of low birthweight infants born to OB Access women is a demonstration of the effectiveness of the OB Access approach.

The short-term costs of this alternative approach are important to consider because they appear to be greater than the Medi-Cal global fee. However, the next phase of the evaluation will investigate the cost impact of the low birthweight percentage being cut from 7.1 to 4.7 percent.

The first cost benefit analysis determines the relative costs of the OB Access package, assuming all women receive all the basic services, which includes nutrition, psychosocial, and health education components in addition to medical care. The cost of the OB Access package is \$177 higher than the current Medi-Cal global fee. For the first cost benefit analysis, it was assumed that the marginal cost was \$177. Medi-Cal pays for approximately 110,000 deliveries a year and, therefore, the additional cost to the Medi-Cal program would be \$19.47 million per year for prenatal care services.

If one assumes the same incidence of low birthweight for the Medi-Cal population as a whole, as for the Medi-Cal sample (7.1 percent), then the 2.4 percent reduction from 7.1 to 4.7 percent means that 2,640 women who delivered low birthweight infants would have delivered normal weight infants (i.e., 2,640 fewer infants would have been low birthweight).

Table 24 shows the estimated NICU costs for these 2,640 low birthweight infants. Based on the 1978 birthweight distribution of infants born to Medi-Cal recipients, 14.96 percent of the 2,640 infants (395 infants) will weigh under 1,500 grams; 18.34 percent (484 infants) will weigh between 1,501 and 2,000 grams; and the remaining 66.69 percent (1,761 infants) will weigh between 2,001 and 2,500 grams. As shown in column 3, the percent of infants needing NICU care varies by birthweight group from 100 percent for infants weighing less than 1,500 grams, to 21 percent for infants in the 2,001 to 2,500 gram group; a total of 1,176 of the original 2,640 infants will be admitted to an NICU for care (column 4).

The average NICU cost of caring for an infant also varies by birthweight group (column 5); very low birthweight infants tend to require more intensive care and longer hospital stays. The total Medi-Cal NICU costs for the 1,176 low birthweight infants admitted to an NICU is estimated to be \$29,114,868 in 1984 dollars.

Table 24

Additional Medi-Cal Neonates Requiring NICU Care
Without OB Access Type Program

Birth-weight (grams)	Low Birthweight		Percent of Infants Needing ^{2/} NICU Care ^{2/} (3)	Infants Admitted to an NICU (4)	Average Cost Per ^{3/} , ^{4/} Admission ^{3/} , ^{4/} (5)	Total Costs (6)
	Percent ^{1/} (1)	Number (2)				
Under 1,500	14.96	395	100	395	\$45,240	\$17,869,800
1,501- 2,000	18.34	484	85	411	17,508	7,195,788
2,001- 2,500	66.69	1,761	21	370	10,944	4,049,280
Total	100.00	2,640		1,176		\$29,114,868

Note: Columns 5 and 6 are in 1984 dollars.

1/ 1978 California Birth Cohort File.

2/ C. K. Korenbrot, "Comprehensive Prenatal Care as a Medi-Cal Benefit: Expected Costs and Savings", Table 8. Institute for Health Policy Studies, University of California, January 31, 1982.

3/ C. K. Korenbrot, "Risk Reduction in Pregnancies of Low Income Women: Comprehensive Prenatal Care Through the OB Access Project", Mobius, July 1984.

4/ Ciaran S. Phibbs, Charges for Level III Neonatal Intensive Care in California. Maternal and Infant Health Section, Department of Health Services, Sacramento, California, 1981.

In addition to NICU costs for 1,176 of the 2,640 low birthweight infants, 538 of these Medi-Cal infants will require non-NICU hospitalization during the first year of life (Table 25). The total Medi-Cal costs for the hospitalization of these 538 infants is \$3,719,526 (column 6).

Table 25

Additional Medi-Cal Neonates
Requiring Non-NICU Hospitalization Without OB Access Type Program

Birth-weight (grams)	Low Birthweight		Percent of Infants Needing Non-NICU ^{2/} Hospitalization ^{2/} (3)	Infants Admitted to a Hospital (4)	Average Cost Per Admission ^{3/} , ^{4/} (5)	Total Costs (6)
	Percent ^{1/} (1)	Number (2)				
Under 1,500	14.96	395	38.2	151	\$9,027	\$1,363,077
1,501- 2,000	18.34	484	21.0	102	8,682	885,564
2,001- 2,500	66.69	1,761	16.2	285	5,161	1,470,885
Total	100.00	2,640		538		\$3,719,526

Note: Columns 5 and 6 are in 1984 dollars.

^{1/} 1978 California Birth Cohort File.

^{2/} C. K. Korenbrot, "Comprehensive Prenatal Care as a Medi-Cal Benefit: Expected Costs and Savings", Table 8. Institute for Health Policy Studies, University of California, January 31, 1982.

^{3/} C. K. Korenbrot, "Risk Reduction in Pregnancies of Low Income Women: Comprehensive Prenatal Care Through the OB Access Project", Mobius, July 1984.

^{4/} Ciaran S. Phibbs, Charges for Level III Neonatal Intensive Care in California. Maternal and Infant Health Section, Department of Health Services, Sacramento, California, 1981.

The total avoided cost, if OB Access care had been provided, would have been \$32,834,394 during 1984. A benefit cost ratio of 1.7:1. A separate economic analysis of the same outcome data using a different methodological approach also indicates a 1.7:1 benefit cost ratio. 14/

The short-run and long-run cost implications are great. If applied statewide, an OB Access type program could save almost \$33 million in the short run. In the long run, savings could be considerably greater.

Another method was also employed to consider the statewide implications of the implementation of the OB Access program. The marginal costs of the additions to the Medi-Cal benefit package were estimated. A sample of OB Access Medi-Cal claims was analyzed and the profile of the actual services that Medi-Cal would have paid for under current policies was developed. These average services were then priced out at current Medi-Cal rates and compared to the actual prenatal expenditures of the OB Access patients.

A 10 percent sample (129) of the 1,254 OB Access cases were selected at random. The actual number of services received by each woman was tabulated and the average number of services per woman calculated. Only the services for which Medi-Cal currently pays were priced out at Medi-Cal rates and the value of the average services determined. This amount is what Medi-Cal would have paid for the OB Access women if they had been in mainstream Medi-Cal and not OB Access. This was \$838.35. The actual expenditures for the most expensive group of OB Access patients, the full care in the last project year (N = 147), was \$953.12. The difference between them is \$114.77. This conservative approach represents the probable incremental cost of adding the OB Access benefits. The \$114.77 figure is less than the theoretical amount of \$177.00 if every woman received every possible benefit. Assuming the marginal cost of \$114.77 per mother, the total annual cost would be $\$114.77 \times 110,000 = \$12,624,700$, with the same projected amount of savings of \$32,834,394. The benefit cost ratio is 2.6:1.

These figures do not include any additional state administrative costs involved in implementing an OB Access program. The amount of start-up costs and annual costs for monitoring the program would be dependent on the way the program is structured and the reimbursement method selected.

Based on the experience of the OB Access project, statewide, the current additional expense would be in the range of \$12.6 to \$19.47 million per annum, and the benefit cost ratio from 1.7-2.6:1. This pilot OB Access program has produced very strong evidence for the current cost-conscious administration to act to improve the health of mothers and infants, as well as to save the hard-pressed taxpayer's dollars.

CONCLUSIONS

Summary

This report is the final evaluation of the federally funded OB Access three-year pilot project. The report evaluates the care, pregnancy outcomes, and costs of care for the 5,388 women who delivered babies under the OB Access project. The findings, from the viewpoint of both the expectant mothers and the researchers, are encouraging. Despite the many obstacles to providing care for a high-risk population of Medi-Cal and other low income women, these women came in for care (had access to care and used it) and a vast majority received early care.

The most important study finding is that the early provision of nutritional, birth education, and psychosocial services had a measurable and positive impact on the birth outcome. The percentage of low birthweight infants born to women who received OB Access pregnancy care was 33 percent less than for the Medi-Cal matched group of mothers. Provision of health care services was organized in a manner which enabled continuity of care as well as ongoing pregnancy monitoring. It has been demonstrated that an enhanced prenatal care program like this can be effectively implemented in underserved areas. If resources had been available, it would have been desirable to augment the maternity care resources in many of the areas before the project started. In spite of this lack, the results are still dramatic.

In this time of cost consciousness, the project findings do offer evidence for the long-term reduction of public expenditures for caring for low birthweight infants. The use of additional funds during the prenatal period reduces both neonatal intensive care unit and infant hospitalization costs. The benefit cost ratio from providing enhanced prenatal care is between 1.7 and 2.6 to 1. Another independent researcher, using a different method, found a ratio of 1.7:1. 15/

These conclusions raise several administrative policy issues for legislative consideration, including the possibility of implementing the scope of project benefits statewide. Early and appropriate prenatal care can cut the incidence of low birthweight by one-third, and improvements in health care delivery systems can bring an even greater decrease. Although zero percent low birthweight is at present an unrealistic goal, given the other causes of low birthweight, we do have the information and the means to achieve a significant reduction in this area.

Policy Recommendations

The results of a study such as this can have major implications for the future direction of prenatal care in California and the United States. The OB Access experience has shown that early and comprehensive prenatal care can be provided to the most economically disadvantaged women. This improved prenatal care results in a 33 percent reduction in the incidence of low birthweight and offers a 1.7-2.6:1 short-term benefit cost ratio. The policy recommendations fall into two main groups: (1) administrative and legislative action and (2) data collection and management information systems recommendations.

Administrative and Legislative Recommendations

Consideration should be given to:

- o Modifying the scope of benefits for Medi-Cal (Medicaid) women to include the package of services provided by the OB Access project.
- o Extending eligibility for pregnant Medi-Cal eligible women to cover the period from the determination of pregnancy to eight weeks after giving birth.
- o Requiring Medicaid providers who are not providing services under the proposed contractual case management method to bill for maternity services on an itemized basis to give the State a full accounting for the actual services provided.

Data Collection and Management Information Systems Recommendations

Consideration should be given to:

- o Continuing the development of a system for the ongoing linkage of all Medi-Cal beneficiary identification numbers so that tracking can be done for Medi-Cal case expenditures and a more accurate cost analysis of maternity related services can be done.
- o Assuring that the fiscal intermediary will make claims' expenditure data available to DHS both on hard copy, as well as on magnetic tape or disc. The unavailability of detailed expenditure data on the Medi-Cal control population group has been a major problem for this and other project staff and for DHS policy makers.
- o Developing and producing annual Medi-Cal expenditure reports on pregnancy outcomes and costs for pregnancy related care. Current fiscal reporting methods appear to consistently underreport the public expenditures of funds on a case-by-case basis.

- o Improving the methods for collecting and recording data on the onset of prenatal care from the California Live Birth Certificate. As one of the most important means to assess both the need for prenatal care and to evaluate improvement in access, these data need to be reported with greater accuracy. Four independent studies (including the present study) have indicated that the official percentage of inadequate care calculated from birth certificate data may reflect only one-third of the actual incidence of this problem.
- o Expanding the current method of reporting data at only the county level because it is insufficient to meet the needs of adequate planning and monitoring. Methods such as the use of census tracts and ZIP codes to more precisely identify the location of, and expenditures for, prenatal care need to be adopted.

In conclusion, our nation's investment in the health of our next generation of citizens is undoubtedly a most economic use of society's resources. It is hoped that the administrative and legislative policy makers who read this report will consider implementing at least some of these recommendations.

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APPENDIX A

OB ACCESS PILOT PROJECT
COMPREHENSIVE SERVICES GUIDELINES

OB ACCESS PILOT PROJECT
NUTRITION GUIDELINES

Nutrition services required over and above those rendered during the initial assessment can be submitted for reimbursement. Appropriate trimester dietary evaluation should be billed to OB Access if the client is not on the WIC Program. In addition, a guideline for service time for a trimester dietary evaluation is 30 minutes per recall.

Service time doubles if the client is not on the WIC program.

A. BIOCHEMICAL (one unit time per trimester)

Hemoglobin -- less than 12 g/100 ml

Hematocrit -- less than 35 percent (PVC)

B. PHYSICAL-MEDICAL

(one unit time)

Two or more pregnancies in one year

Five or more pregnancies

Taking diet pills or over counter drugs

Excessive dental carries, major teeth loss

History of hypertension, heart disease,
cancer in immediate family, or abnormal

Pap. (class 11 or above)

Excessively large previous infants (gr. than 4000 gr.)

One or more previous premature labors

One or more low birth weight infants (less than 2500 g.)

Previous stillbirth or neonatal loss

Two or more previous abortions

Previous infant with known genetic, familial, or
congenital disorder

Hx of, or actual emotional problems

Client less than 18 years

Client more than 40 years (35 if nulliparous)

C. DIETARY

(one unit time)

Dieting while pregnant

Limited fluid intake

Excessive junk food intake (refined CHO)

Excessive or deficient caloric intake

Excessive caffeine intake

Deficiencies of vitamin A, C, folic acid

B. PHYSICAL-MEDICAL

(One unit time per trimester)

Diabetes

Preeclampsia. hypertension or
any chronic medical, neuro-
logical, endocrine or meta-
bolic disorder

Frequent urinary tract infec-
tions

Exposure to known teratogens

Uterine bleeding

Inappropriate fetal growth

for gestational age

Alcohol, drug, smoking abuse

Recurrent diarrhea or consti-
pation

Persistent nausea or vomiting

C. DIETARY

(one unit time per trimester)

Protein deficiency

Ca deficiency

PICA

Excessive NaCL, sugar, or fat
intake

Fe, or trace mineral deficien

D. ANTHROPOMETRIC

(One unit time)

Overweight: 20% or more above Standard Weight for height

Underweight: 10 % or more below Standard Weight for height

(One unit per trimester)

Inappropriate weight gain (too much or too little)

E. OTHER FACTORS AFFECTING NUTRITIONAL STATUS: (one unit time)

Women with no support for pregnancy

Woman abused by family member, stressful relationship

Limited education

Learning handicap-mentally slow or delayed

Language problem

Wide mood swings, depression

OB ACCESS PILOT PROJECTS
Education Guidelines

Reimbursement for education services is provided in (1) the Basic OB Access package and (2) Additional Services. Reimbursement is also available for education that is provided to women who have education handicaps.

I BASIC PACKAGE

The basic package consists of:

1. Education assessment and care plan.
2. Usual and customary information and explanation which is part of routine care and which can be done during the time allotted for medical examinations.
3. Classes - Prenatal and Parenting

Alternatives to classes

If a patient cannot attend classes which are indicated on her care plan, the education can be provided on an individual basis. Acceptable reasons for patients not attending classes may include:

- a. medical reasons
- b. patient works when classes are given
- c. transportation problems
- d. language or cultural barriers

Units of Time: 2 units (1/2 hour) of individual education for each 1-hour class that is missed.

II ADDITIONAL SERVICES are available to women who require more and/or different education than is available in the basic OB Access service package.

A. Intervention Objectives and units of time

The objectives may be behavioral e.g. to quit smoking or a step toward behavior change, e.g. understanding harmful effects of smoking, depending on the significance and complexity of the problem, as well as the agency's resources. Education services will be reimbursed for objective 1 or objective 2, or objective 3, as follows:

1. Information and Explanation - patients will understand the nature and implications of the problem. 1 unit

2. Education For Informed Decision Making - patients will be able to make informed decisions. 3 units
3. Education For Behavior Change - patients will adopt new behavior. 4 units
4. Education Handicaps - more time may be needed for services in the basic package or for additional services if a woman has a learning handicap, e.g. 1 unit
 - a. slow learner
 - b. cannot read or write
 - c. low education level
 - d. non-English speaking
 - e. age less than 17
 - f. very shy
 - g. resistant
 - h. negative
 - i. apathetic
 - j. excessive anxiety
 - k. emotional problems
 - l. stressful relationships

Except for slow learners, these do not automatically imply that a patient has an education handicap. Providers will have to make judgements whether the conditions or situations interfere with learning.

The unit of time for education handicaps for individual counselling can be added to each of the following:

- a. assessment
- b. orientation
- c. each 1-hour class
- d. usual and customary education during medical exam
- e. high risk medical conditions
- f. high risk behavior
- g. special interests

B. Categories For Intervention

1. High Risk Behavior that can be modified or changed by education and for which more time is needed than is available during the medical exam, e.g.
 - a. smoking
 - b. drug abuse
 - c. alcohol abuse
 - d. non-compliance with medical advice/regimen
2. High Risk Medical Conditions - education interventions for high risk medical conditions should be provided by a certified medical professional.

High risk medical conditions that can be alleviated or improved through education and for which more time is needed than is available during medical exams, e.g.

- a. diabetes
- b. hypertension

- c. uterine problems
- d. blood disorders
- e. pulmonary disease
- f. cardio-vascular problems
- g. genetic problems
- h. kidney problems
- i. Rubella, hepatitis, malaria, TB, herpes
- j. age 17 or less, or more than 35
- k. para V or more
- l. 2nd pregnancy within one year

3. Special Interests that can be enhanced by education and for which more time is needed than is available during medical exams, e.g.

- a. BTL
- b. various styles of delivery
- c. trails of labor after C-section

Third Party Reimbursement is granted for psychosocial services provided in two areas: 1) OBA Basic Package, and 2) Additional psychosocial services delivered during the course of OB Access care.

BASIC PACKAGE - Psychosocial services delivered as part of the OBA Basic Package include:

1. Initial Assessment
 - a. Identification of problems
 - b. Specification of treatment methods and objectives
2. Patient's Care Plan
 - a. The Care Plan developed for the individual patient links the patient's assessment with the plan for services intervention.
 - b. Psychosocial services ought to be planned, implemented and evaluated in relation to all other OBA services delivered to the patient.

ADDITIONAL PSYCHOSOCIAL SERVICES - Psychosocial services beyond the Initial Assessment and development of the Patient Care Plan are defined as follows:

1. Through provision of these psychosocial services, a patient initially assessed as high risk can be moved to a low risk assessment and thereby maintain a health pregnancy throughout the course of OBA care.
2. Requests for reimbursement for Additional Psychosocial Services must include the following:
 - a. Identification of Problem
 - b. Intervention Method
 - c. Intervention Objective
3. Intervention Methods
 - a. Individual Counseling
 - b. Group Counseling
 - c. Home Visit
4. Intervention Objectives
 - a. Maintenance Level Functioning - Those services which are required to assist a patient to reach and maintain a normal (low risk) pregnancy.
 - b. Referral to Community Agency or Resource - Short term services which link patient to long term treatment or assistance.
 - c. Followup - Short term contact which verifies that Maintenance Level Functioning is occurring or that Referral has been accomplished.

IDENTIFICATION OF PSYCHOSOCIAL PROBLEMS - OBA

A. ANXIETIES RE: PRESENT PREGNANCY

1. Ambivalence or Rejection of Current Pregnancy
2. Paternity Conflicts (including Abuse, Non-Support)
3. Complications with Previous Pregnancy or Delivery

B. HIGH RISK BEHAVIOR

1. Drug and Substance Abuse
2. Non-Compliance with Medical Advice
3. Second Pregnancy Within One Year

C. PSYCHIATRIC HISTORY

1. Clinical Depression
2. Clinical Anxiety
3. Psychotic Thinking/Behavior
4. Suicidal or Homocidal

D. EXTREME ANXIETIES RE: LABOR AND DELIVERY

1. C-Section
2. Pain
3. Death
4. Losing Control of Herself
5. Being Alone During Labor
6. Use of Forceps
7. Being with an Insensitive Hospital Staff
8. Not Being Able to Have Baby After Delivery
9. Baby may be Abnormal

E. PHYSICAL/MEDICAL PROBLEMS

1. Tubal Ligation
2. Premature or Problematic Birth
3. Hysterectomy or Other Surgery
4. Miscarriage
5. Anticipated Delivery Complications

F. ENVIRONMENTAL DEFICIENCIES IMPINGING ON PREGNANCY

1. Child Care
2. Housing
3. Money Management Skills
4. Transportation
5. Clothing
6. Employment or Training Needs
7. Legal Assistance Needs

G. FURTHER PROBLEMS IMPINGING ON PREGNANCY

1. Physical Handicap
2. Non-English Speaking
3. Retardation or Limited Intelligence
4. Less than 18 years of Age
5. Social Isolation/Inadequate Support System

UNITS OF TIME

Section A, B, D, E, and G

- Services Objective: Maintenance level Functioning
- Reimbursement Guidelines: Two units per problem

Section C

- Services Objective: Referral; Maintenance level functioning
- Reimbursement Guidelines: 4 units for referral + 2 units/trimester

Section F

- Services Objective: Referral
- Reimbursement Guideline: 4 units for referral

APPENDIX B

INSTRUCTIONS FOR ABSTRACTING
OB ACCESS MEDICAL DATA

1.a. Name of Project

1.b. OB Access Case No.
(1-7)1.c. Place of Birth/County
(8-10) (11-12)

Abstractor

2. PATIENT IDENTIFICATION

A. County of residence

B. Mother's date of birth

M M D D Y Y

C. Marital status

D. Race of mother

E. Education of mother

F. Gross monthly income

3. HEALTH HISTORY

A. LMP

M M D D Y Y

B. Pregnancy history

Gravida

Para

Term pregnancy

Premature birth

Living children

Spontaneous abortion

Induced abortion

C. Preexisting risk factors

D. EDC

M M D D Y Y

4. INITIAL PREGNANCY PROFILE

A. Date of 1st exam

M M D D Y Y

B. Height

C. Weight

D. Hemoglobin

E. Hematocrit

F. Nutritional deficiency

G. Vitamins

H. Iron supplements

I. Number of prenatal visits

Tape
Position
13-14

15-20

21

22

23-24

25-28

29-34

35-36

37-38

39-40

41-42

43-44

45-46

47-48

49-58

59-64

65-70

71-72

73-76

77-79

80-82

83-86

87-88

89-90

91-92

5. LAST PRENATAL EXAM

A. Date of last exam

M M D D Y Y

B. Weight

C. Hemoglobin

D. Hematocrit

E. Pregnancy risk factors

6. DISPOSITION OF REGISTRANT

7. LABOR AND DELIVERY

A. Complications of labor and delivery

B. Method of delivery

C. Presentation

8. NEWBORN

A. Date of delivery

M M D D Y Y

B. Birth number/order

C. Admitted to Intensive Care Unit

D. Apgar

5 minutes

E. Baby's sex

F. Baby's weight

G. Baby's gestation age by exam

H. Date of discharge

M M D D Y Y

I. Status

9. MOTHER'S DISCHARGE SUMMARY

A. Date of discharge

M M D D Y Y

B. Status

10. DATE OF POSTPARTUM EXAM

A. Mother

M M D D Y Y

B. Infant

M M D D Y YTape
Position
93-98

99-102

103-105

106-108

109-118

119-120

121-130

131-132

133

134-139

140

141

142-143

144

145-148

149-150

151-156

157

158-163

164

165-170

171-176

OB ACCESS
Instructions for abstracting medical data to the coding form

ITEM

CODING INSTRUCTIONS

Identifying Information

A. Complete the top portion of the coding form

Name of Project
 OB Access ID#

OB Access project name (Appendix A)
 Form PM 332—item 4, code seven digits, right justify with lead zeros.

Place of birth

Code three digits for hospital from the Maternity Hospital code book;
 Homebirth 999
 Outside of hospital, but not at home or in an alternative birthing center 888
 Alternative birthing center 000
 Out-of-State 989
 If unknown, leave blank.

County of Occurrence

Code two digits for county (Appendix B) right justify with lead zeros.

Patient Information

A. County of residence

Code two digits (Appendix B)

B. Mother's date of birth

Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify with lead zeros:
 Example: 07 03 59
 month day year
 If age is given in years—subtract age from year of registration. If unknown, leave blank.

C. Marital status

Code one digit as follows:

Married	1
Single parent	2
Living together (including common law)	3
Never married (< 18)	4
Separated, widowed, or divorced	5

If not recorded or unknown, leave blank.

D. Race/Ethnicity of mother

Code one digit using Appendix D. Write ethnicity on form.
 Right justify with lead zeros. If unknown, leave blank.

E. Education of mother

Code two digits. If some formal education is noted, but not the number of years—code 88; no formal education—code 99; GED = 12 years; if unknown, leave blank. Right justify with lead zeros.

F. Gross monthly income

Code four digits, right justify with lead zeros.

Health History

A. Last menstrual period (LMP)

Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify month and day with lead zeros.

Example: 07 03 59
 month day year

If unknown, leave blank.

B. Pregnancy history

Gravida Para
 Term pregnancies
 Premature birth
 Living children
 Spontaneous abortion
 Induced abortion

Code two digits (Appendix E)—right justify with leading zeros. If type of abortion is not stated—code both spontaneous and induced with zeros (0). If unknown, leave blank.

ITEM

C. Pre-existing risk factors

CODING INSTRUCTIONS

Code up to five indicators with two digits as follows:

- 1—Cardiac disease (rheumatic fever, murmurs, congenital heart disease)
 - 2—Chronic lung disease (TB, asthma, cystic fibrosis, emphysema)
 - 3—Congenital chromosomal abnormalities
 - 4—Gynecological disorders (gynecological surgery, incompetent cervix, DES exposure, small pelvis, uterine malformation, "habitual" (2 or more) abortions, infertility, PID (pelvic inflammatory disease)
 - 5—Drug abuse—excessive or improper use of a medicinal or chemical substance including over-the-counter drugs, narcotics, street drugs. NOT including marijuana or alcohol
 - 6—Alcohol abuse
 - 7—Blood dyscrasias (sickle cell anemia, thalassemia, clotting deficiencies, iron deficiency anemia)
 - 8—Chronic renal or kidney disease
 - 9—Chronic hypertension
 - 10—Chronic liver disease, hepatitis
 - 11—Collagen vascular disease (rheumatoid arthritis, lupus erythematosus)
 - 12—Diabetes mellitus
 - 13—Gestational diabetes
 - 14—Thyroid dysfunction (hypo- or hyper-)
 - 15—Seizures, convulsions, epilepsy
 - 16—Emotional, psychological, or nervous disorders
 - 17—RH ABO sensitivity, isoimmunization
 - 18—Phlebitis, varicosities
 - 19—Cancer, leukemia, malignancies
 - 20—Venereal disease
 - 21—Prior C-Section
 - 22—Prior prenatal or labor and delivery problems (pre-eclampsia, eclampsia, postpartum hemorrhage or infection, precipitous delivery)
 - 23—Prior episiotomy
 - 24—Preterm infant (< 37 weeks' gestation) or SGA infant
 - 25—Low birth weight infant (< 2500 grams—5 lbs. 8 oz.)
 - 26—LGA or infant > 4000 grams—8 lbs. 13½ oz.
 - 27—Mental retardation
 - 28—Obesity (see chart at left)
 - 29—Battered as a child, as a wife, as a woman
 - 30—Child abuser
 - 31—Little or nonexistent English speaking, reading, or writing
 - 32—Stress (specify)
 - Child care
 - Money management
 - Housing
 - Transportation
 - Clothing
 - Employment/training
 - Immigration
 - Legal problems
 - Marital problems
 - 33—Significant familial history of disease or abnormality
 - 34—> 5 pregnancies
 - 35—Fetal demise or fetal death (death occurring after 20 weeks' gestation)
 - 36—Neonatal death (death occurring in the first 28 days of life)
 - 37—Infant death (death occurring in the first year of life)
 - 38—Prior neonatal or infant death (age not specified)
 - 98—Marijuana smoking
 - 99—Cigarette smoking
 - 40—Other factors (specify)
 - Prior infant with neurological damage
 - Prior infant with known genetic/birth damaged/problems
 - Prior infant relinquishment
 - Multiple birth
 - Short stature
 - Religion
- MEDICATIONS**
- 41—Anticoagulants
 - 42—Anticonvulsants
 - 43—Antihypertensives
 - 44—Other medications (specify)
 - 88—No risk factors noted

OBESITY CHART:

Use prepregnant weight

6'	205
5'10"	195
5'8"	185
5'6"	175
5'4"	165
5'2"	155
5'0"	150

D. Estimated date of confinement (EDC)

Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify month and day with lead zeros.

Example: 07 03 59
 month day year

ITEM

CODING INSTRUCTIONS

Initial Pregnancy Profile

A. Date of first exam

Code with two digits for month (Appendix C), two digits for day, and two digits for year. Right justify with lead zeros for month and day.

Example: 07 03 59
 month day year

B. Height

Code with two digits for inches. Example: 5' 4½" converts to 64. (See Appendix F.) If unknown, leave blank.

C. Weight

Code four digits using the prepregnancy or first visit weight. Left justify with lead zeros.

Example: 156½=1565 120=1200

D. Hemoglobin

Code three digits. If unknown, leave blank. Pick up the earliest test results.

E. Hematocrit

Code three digits. If unknown, leave blank. Pick up the earliest test results.

F. Nutritional deficiency

Code one digit at the right as follows for evaluation/assessment:

Adequate/well-nourished	1
Inadequate	2
Severe (if three or more major nutrients are missing or elements up)	3

Code up to three one-digit codes as follows:

↑NaCl (sodium chloride, table salt)	1
↑Fat	2
↑CHo (carbohydrates)	3
↓Protein	4
↓Ca	5
↓Vitamin C, B, A, Folate, and Fiber	6

Example: ↑CHo, ↓Pro, ↓Ca

If unknown, leave blank.

G. Prenatal vitamins

Code two digits for the number of months the vitamins were supplied. Right justify with lead zeros. Code 88 if vitamins were given but number of months unknown.

H. Iron supplement (Fe)
tablets/shots

Code with two digits for the number of months iron tablets were supplied and taken by the patient. If tablets were given BUT not taken, code 99. Make a notation on the form if:

iron was not taken and shots were given

iron was taken and shots were given (indicate the number of shots given)

Code 88 if iron given but number of months/shots unknown.

I. Number of prenatal visits

Code two digits. Right justify with lead zeros.

Last Prenatal Exam

A. Date of last exam

Code two digits for month (Appendix C), and two digits for day, and two digits for year. Right justify with lead zeros for month and day.

Example: 07 03 59
 month day year

B. Weight

Code four digits using the last weight recorded either at the exam or upon entry into the hospital. Left justify with lead zeros.

Example: 156½=1565 120=1200

If unknown, leave blank.

C. Hemoglobin

Code three digits. If unknown, leave blank.

D. Hematocrit

Code three digits. If unknown, leave blank.

E. Pregnancy risk factors that appear during current pregnancy

Code up to five complications, two digits, as follows:

- 1—Anemia (HCT less than 35 and/or HGB less than 12)
- 2—Diabetes mellitus
- 3—Gestational diabetes
- 4—Hypertension (BP 140/90 or a change of $\frac{30 \text{ mm Hg systolic}}{15 \text{ mm Hg diastolic}}$)
- 5—Cystitis, asymptomatic bacteruria, or otherwise unspecified UTI
- 6—Pyelonephritis
- 7—Pre-eclampsia (hypertension as defined above and proteinuria, in the absence of UTI and edema)
- 8—Eclampsia (same as pre-eclampsia with neurological symptoms such as: hyper-reflexia, visual disturbances, convulsions, coma)
- 9—Drug abuse (see definition on pre-existing risk factors)
- 10—Alcohol abuse—daily or several times per week
- 11—Severe respiratory infections (bronchitis, pneumonia)
- 12—Thrombophlebitis, varicosities
- 13—Venereal disease (herpes, syphilis, gonorrhea, trichomonas)
- 14—Vaginitis
- 15—Threatened abortion
- 16—RH sensitization
- 17—Vaginal bleeding in the first 26 weeks
- 18—Vaginal bleeding after 26 weeks
- 19—Significant physical trauma ("susto"), injury, or accident (significant enough to warrant an unscheduled visit)
- 20—Surgery during pregnancy
- 21—Intrauterine/fetal growth retardation/placental insufficiency
- 22—Multiple pregnancy (twins, etc.)
- 23—Second pregnancy in 12 months
- 24—Obesity
- 25—Postdates or postmaturity (> 42 weeks)
- 26—No prenatal care or care begun after 26 weeks' gestation
- 27—Stress (specify)
- 28—Little/nonexistent English speaking/reading/writing
- 29—Inadequate weight gain/Failure to gain weight appropriately
- 30—Predelivery hospitalization
- 31—Abnormal estriol levels
- 32—Exposure to chemicals, pesticides or other teratogens
- 33—Infectious teratogens (CMV, rubella, mumps, polio, herpes) exposure
- 34--+ PPD during pregnancy
- 35—Other problems of pregnancy (specify)
- 88—No risks identified
- 98—Marijuana smoking
- 99—Cigarette smoking
- 44—Narcotics
- 45—Oral contraceptives
- 46—Steroids, hormones

MEDICATIONS

- | | |
|---------------------------|------------------------------------|
| 36—Antibiotics | 47—Psychotherapeutics |
| 37—Anticonvulsant | 48—TB medications |
| 38—Decongestant | 49—Antiparasitic |
| 39—Antihypertensive | 50—Tranquilizers |
| 40—Antinausea, antiemetic | 51—Vaginal medications |
| 41—Aspirin | 52—Other medications (specify) |
| 42—Diuretic | 53—Medications taken, type unknown |
| 43—Thyroid medication | |
- Right justify; if unknown, leave blank.

ITEM

CODING INSTRUCTIONS

Disposition of Registrant

Code as follows in the left cell:

Complete	1
Withdrawal	2
Withdrawn to private doctor or facility	3
Completed/ineligible financially	4
Withdrew/reinstated/completed	5
Withdrew at request of project due to noncompliance	6
Completed delivery at hospital not in program (emergency delivery)	7
Over enrolled (Money was recouped from second and third year cases)	8

Code as follows in the right cell:

Delivered alive (after mother withdrew from/ left the project)	1
Delivered stillborn (after mother left the project)	2
Spontaneous abortion (miscarriage)	3
Incomplete/missed abortion with D&C or other surgical procedure.	4
Hydatidiform mole	5
Ectopic pregnancy	6
Not pregnant	7
Unable to locate/moved/unknown	8
TAB	9

Example: 1 3
 Completed Spontaneous
 abortion
 2 4
 Withdrawal Missed abortion

Labor and Delivery

A. Complications of labor and delivery

Code up to five indicators; code two digits, right justify with lead zeros.

- 1—Postterm or postmature (> 42 weeks)
- 2—Preterm labor without delivery
- 3—Preterm delivery (< 37 weeks)
- 4—Placenta praevia
- 5—Placental abruption or abruptio placenta
- 6—Postpartum hemorrhage (> 500 ccs blood loss after vaginal delivery
> 1000 ccs blood loss after C/S)
- 7—Postpartum infection, site not necessarily specified
- 8—Chorioamnionitis, amnionitis, foul smelling amniotic fluid
- 9—Meconium stained fluid
- 10—Premature rupture of membranes (before 37 weeks) or prolonged rupture of membranes (more than 24 hours before delivery)
- 11—Maternal fever (T 100.4+ on two occasions with 6 hours between readings)
- 12—Polyhydramnios (> 2000 ccs amniotic fluid)
- 13—Oligohydramnios (< 300 ccs amniotic fluid)
- 14—Fetal decelerations, unspecified or fetal distress (0—6 APGAR; pH factor 7.2)
- 15—Fetal decelerations type I (early, head compressions)
- 16—Fetal decelerations type II (variable, cord compressions)
- 17—Fetal decelerations type III (late, placental insufficiency)
- 18—Nuchal cord (cord around the neck)
- 19—Truncal cord (cord around the trunk of body or arm and trunk, etc.)
- 20—True knot in cord
- 21—Prolapsed cord
- 22—Dystocia, failure to progress
- 23—Precipitous delivery (< 3 hours labor)
- 24—Prolonged labor (> 20 hours; first and second stages)
- 25—Cephalopelvic disproportion (CPD)
- 26—Fetal bradycardia (< 120 beats/min)
- 27—Fetal tachycardia (> 160 beats/min)
- 28—Loss of beat to beat variability or fixed baseline
- 29—Anesthesia complications
- 30—Fetal acidosis (pH X 7.2 in utero)
- 31—Episiotomy
- 32—Perineal lacerations, (1st and 2nd degree)
- 33—Perineal lacerations, (3rd and 4th degree)
- 34—Cervical lacerations
- 35—Vaginal lacerations

ITEM

CODING INSTRUCTIONS

- 36—Peri-urethral lacerations
- 37—Maternal seizures or arrest of dilation during labor
- 38—Retained placenta (> 30 minutes after delivery of infant)
- 39—Manual removal of placenta
- 40—Eclampsia (more than 25 gm of magnesium sulfate MgSO₄)
- 41—Prolonged second stage of labor (> 2 hours)
- 42—Ruptured uterus
- 43—None specified
- 44—Other problems (specify)
 - Induction
 - Uterine tetany
 - Prolonged/prodrome
 - Pitocin augmentation
 - Cervical dystocia

B. Method of delivery

VAGINAL—Code two digits as follows:

- 1—Spontaneous
- 2—Low forceps
- 3—Mid forceps
- 4—Forceps rotation
- 5—Vacuum extraction
- 6—Type unspecified

BREECH

- 7—Spontaneous
- 8—Partial extraction
- 9—Total extraction
- 10—Forceps to (after coming) head
- 11—Type unspecified

CAESAREAN SECTION

- 12—Low cervical; transverse-primary
- 13—Low cervical; vertical-primary
- 14—Classical-primary
- 15—Caesarean hysterectomy-primary
- 16—Low cervical; transverse-repeat
- 17—Low cervical; vertical-repeat
- 18—Classical-repeat
- 19—Type unspecified

Right justify—fill in lead zeros. If unknown, leave blank.

C. Presentation

Code one digit as follows:

- 1—Occiput
- 2—Mentus (face)
- 3—Frontum (brow)
- 4—Sacrum (complete or frank breech)
- 5—Scapula (transverse lie)
- 6—Footling breech
- 7—Compound, hand

If unknown, leave blank.

Newborn

A. Date of delivery

Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify month and day with lead zeros. If unknown, leave blank.

Example: 06 24 80
 month day year

B. Birth number/order

Code as follows:

- | | |
|---|---|
| Single birth | 0 |
| Twin, 1st born | 1 |
| Twin, 2nd born | 2 |
| Triplet, 1st | 3 |
| Triplet, 2nd | 4 |
| Triplet, 3rd | 5 |
| Quadruplet or higher order multiple birth | 6 |
| Order unknown | 9 |

C. Admitted to intensive care, nursery

Code as follows:

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If unknown, leave blank

ITEM

CODING INSTRUCTIONS

- D. Apgar at five minutes
Code two digits, right justify with lead zeros. Code TOTAL only. Maximum = 10. If no apgar rating is given, but the Dr. indicates a healthy, viable child, etc. = code 7 (Appendix H).
- E. Baby's sex
Code one digit as indicated:
 Female 1
 Male 2
 Ambiguous/unable to tell 3
 If unknown, leave blank
- F. Baby's weight
Code four digits. If necessary to convert pounds and ounces to grams, see Appendix G. If unknown, leave blank.
- G. Baby's gestation age by exam
Code two digits. Data taken from Dr.'s labor and delivery notes or by calculating the last prenatal exam gestation age and the date of exam with the date of delivery. If unknown, leave blank.
- H. Date of discharge
Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify with lead zeros.
 Example: 07 03 59
 month day year
- I. Status
Code one digit as follows:
 Home, no problems 1
 Newborn problems, remained in hospital after mother's discharge (specify) 2
 Deceased in utero (known before giving birth) 8
 Placed for adoption 4
 Readmitted to hospital within 28 days of age 5
 Other (specify) 6
- In those cases where specification is needed, use the list below to describe the conditions present:
 Asphyxia
 Birth injury (fracture, nerve injury)
 Cardiovascular (heart defects, heart murmurs)
 Congenital anomalies
 Hematologic (polycythemia, anemia, etc.)
 Gastrointestinal (obstruction, meconium plug, tracheoesophageal fistula)
 Genitourinary (acute tubular necrosis, renal failure)
 Metabolic (hypoglycemic, hyperbilirubinemia)
 Neurologic (convulsions, seizures, CNS hemorrhage)
 Sepsis/infection (bacterial, viral, congenital)
 Respiratory (apnea, respiratory distress syndrome, periodic breathing)
 Addicted infant
 Other factors
- Home, no problems, died later 7
 Born alive with or without problems. Died prior to leaving hospital 3
 Stillborn—FHT heard before delivery. Dead at birth 9
- If unknown, leave blank.

Mother's Discharge Summary

- A. Date of discharge
Code two digits for month (Appendix C), two digits for day, and two digits for year. Right justify with lead zeros.
 Example: 07 03 59
 month day year
- B. Status
Code one digit as follows:
 Home without problems 1
 Maternal mortality 2
 Prolonged postpartum stay (> 3 days if vaginal delivery; > 6 days if C/S) 3
 Readmitted with problems related to pregnancy, delivery, or postpartum; specify 4
 Home with problems (i.e., antibiotics for infection, INH, Flagyl, O&P) 5
 Post-op complications that require extra days in the hospital (Dr. error) 6
 If unknown, leave blank
- Date of Postpartum Exam
- A. Mother
Code with two digits for month, two digits for day, and two digits for year. Use Appendix C for month code. Right justify with lead zeros. If unknown, leave blank.
- B. Infant
Code two digits for month, day, and year.

ITEM

CODING INSTRUCTIONS

1. Multiple Births

A. Code all identifying information in Item 1:

Name of project

OB Access case number

Place of birth and county of occurrence

Abstractor

B. Start coding at Item 7. LABOR AND DELIVERY—through 8.I. STATUS

Also code Item 10-B.

APPENDIX A

OB ACCESS PROJECTS

Title V—Title XIX	Contractor	County Location
110,000—190,000	City of Berkeley Health Department	Alameda
810,000—890,000	Clearlake Indian Health Board	Lake Mendocino
210,000—290,000	East Oakland Community Health Alliance, Inc.	Alameda
910,000—990,000	Kings County Health Department	Kings
310,000—390,000	La Clinica De La Raza-Fruitvale Health Project, Inc.	Alameda
1,010,000—1,090,000	Northeastern Rural Health Clinics	Lassen, Modoc, Siskiyou
111,000—119,000	Northern California Coalition for Rural Health, Inc.	Shasta, Trinity, Lassen, Modoc
410,000—490,000	San Diego County Department of Health Services	San Diego
510,000—590,000	Santa Barbara County Health Department	Santa Barbara
610,000—690,000	Sonoma County Indian Health Project, Inc.	Sonoma
710,000—790,000	United Indian Health Services, Inc.	Humboldt

APPENDIX B

COUNTIES WITH OB ACCESS PROJECTS

<u>Code</u>	<u>County</u>	<u>Code</u>	<u>County</u>	<u>Code</u>	<u>County</u>
01	Alameda	18	Lassen	42	Santa Barbara
12	Humboldt	23	Mendocino	45	Shasta
16	Kings	25	Modoc	47	Siskiyou
17	Lake	37	San Diego	49	Sonoma
				53	Trinity

COUNTY OF RESIDENCE

<u>Code</u>	<u>County</u>	<u>Code</u>	<u>County</u>	<u>Code</u>	<u>County</u>
01	Alameda	21	Marin	41	San Mateo
02	Alpine	22	Mariposa	42	Santa Barbara
03	Amador	23	Mendocino	43	Santa Clara
04	Butte	24	Merced	44	Santa Cruz
05	Calaveras	25	Modoc	45	Shasta
06	Colusa	26	Mono	46	Sierra
07	Contra Costa	27	Monterey	47	Siskiyou
08	Del Norte	28	Napa	48	Solano
09	El Dorado	29	Nevada	49	Sonoma
10	Fresno	30	Orange	50	Stanislaus
11	Glenn	31	Placer	51	Sutter
12	Humboldt	32	Plumas	52	Tehama
13	Imperial	33	Riverside	53	Trinity
14	Inyo	34	Sacramento	54	Tulare
15	Kern	35	San Benito	55	Tuolumne
16	Kings	36	San Bernardino	56	Ventura
17	Lake	37	San Diego	57	Yolo
18	Lassen	38	San Francisco	58	Yuba
19	Los Angeles	39	San Joaquin	59	Out-of-State
20	Madera	40	San Luis Obispo	99	Unknown

The term "by place of residence" refers to the usual residence of the mother for births and fetal deaths.

APPENDIX C

MONTH

<u>Code</u>	<u>Month</u>
01	January
02	February
03	March
04	April
05	May
06	June
07	July
08	August
09	September
10	October
11	November
12	December

APPENDIX D1

LIVE BIRTHS

CHS 1973 RACE RECODES AND IDENTIFICATIONS	KEY PUNCHED RACE AND ETHNICITY COMBINATIONS (TENS DIGIT-RACE, UNITS DIGIT-ETHNICITY)
1 White	11, 19
2 Black	21, 22, 23, 24, 25, 26, 27, 29
3 Mexican/American	12, 32, 42, 52
4 American/Indian	31, 36, 37, 39
5 Chinese	13, 33, 43, 53
6 Japanese	14, 34, 44, 54
7 Filipino	15, 35, 45, 55
8 Other	16, 17, 41, 46, 47, 49, 51, 56, 57, 59

LIVE BIRTHS

CHS 1980 RACE RECODES AND IDENTIFICATIONS	KEY PUNCHED RACE AND ETHNICITY COMBINATIONS (TENS DIGIT-RACE, UNITS DIGIT-ETHNICITY)
1 White	11, 18, 19, 91, 98
2 Black	21, 22, 23, 24, 25, 26, 27, 28, 29
3 Mexican/American	12, 32, 42, 52, 92
4 American/Indian	31, 36, 37, 38, 39
5 Chinese	13, 33, 43, 53, 93
6 Japanese	14, 34, 44, 54, 94
7 Filipino	15, 35, 45, 55, 95
8 Other	16, 17, 41, 46, 47, 48, 49, 51, 56, 57, 58, 59, 96, 97
9 Unknown	99

APPENDIX D2

RACE AND ETHNICITY TABLES

RACE TABLE

RACE CODE	DESCRIPTION
1	White
2	Black
3	American Indian
4	Asian
5	Other
9	Unknown or unreported

ETHNICITY TABLE

ETHNICITY CODE	DESCRIPTION
1	Other
2	Mexican/American
3	Chinese
4	Japanese
5	Filipino
6	Hawaiian
7	Vietnamese
8	Other Spanish/Hispanic Includes: Puerto Rican, Cuban, and all others with ancestry originating in Central and South America Excludes Mexican/American (2) and Brazilian (1)
9	Unknown or Unreported.

COLOR OR RACE

On live births and fetal deaths prior to 1970 the race of child was coded by visually comparing race of mother and race of father. Beginning with 1970 the race of father and of mother was coded independently and the race of child was generated by comparing the two parents' codes and following a set of rules. The coding rules included:

- (1) Where the race of mother and father is the same code, the child's race will be the same code, except where both the mother's and father's race is Unknown, the race of child is White.
- (2) If either of the parents is White and the other parent's race is any code except White or Unknown, the race of the child will be the same as the other parent.
- (3) If either one of the parents' codes is Black, the child's code is Black.
- (4) If neither parent's code is White, Black, or Unknown, and the parents' codes are different, the father's code will be selected for the child.
- (5) If the code for one parent is Unknown, but the code for the other is known, then the known code is selected for the child.

Race/ethnic group classifications generated by the Birth Cohort File (see Sources and Quality of Vital Statistics Data) include a category for White-Spanish and for White-non-Spanish; these categories are determined through use of a computer program which matches the maiden surname of the mother and the surname of the father against a list of Spanish surnames. The list of surnames was developed by Dr. Robert Buechley based on a list prepared by the U.S. Census Bureau.

Source: 1977 Vital Statistics of California.

Beginning with 1980, a new category was added to "Ethnicity" code for live births. The new category is Spanish/Hispanic (coded "8"), which includes Puerto Rican, Cuban, and all others with ancestry originating in Central and South America (excluding Mexican-American and Brazilian).

**RACE CODING SCHEME: 1980
GENERATED RACE OF CHILD**

Race of Father	Race of Mother					
	1	2	3	4	5	9
1	1	2	3	4	5	1
2	2	2	2	2	2	2
3	3	2	3	3	3	3
4	4	2	4	4	4	4
5	5	2	5	5	5	5
9	1	2	3	4	5	9

**ETHNICITY CODING SCHEME: 1980
GENERATED ETHNICITY OF CHILD**

Ethnicity of Father	Ethnicity of Mother									
	1	2	3	4	5	6	7	8	9	
1	1	2	3	4	5	6	7	8	1	
2	2	2	2	2	2	2	2	2	2	
3	3	3	3	3	3	3	3	3	3	
4	4	4	4	4	4	4	4	4	4	
5	5	5	5	5	5	5	5	5	5	
6	6	6	6	6	6	6	6	6	6	
7	7	7	7	7	7	7	7	7	7	
8	8	8	8	8	8	8	8	8	8	
9	1	2	3	4	5	6	7	8	9	

PREGNANCY HISTORY

Gravidity

1. A *gravida* is a pregnant woman (normal pregnancy to birth; TAB; SAB; h moli; ectopic pregnancy).
2. The word *gravida* refers to a pregnancy regardless of its duration.
3. A woman's *gravidity* relates to the total number of her pregnancies, regardless of their duration.
4. A *primigravida* is a woman pregnant for the first time.
5. A *secundagravida* is a woman pregnant for the second time.
6. A *multigravida* is a woman who has been pregnant several times.

Parity

1. The word *para* alludes to past pregnancies that have reached viability (20 weeks [state law] ; 500 gms. or 24 weeks requires fetal death certificate).
2. *Parity* refers to the number of past pregnancies that have gone to viability and have been delivered, regardless of the number of children involved. (For example, the birth of triplets increases the parity by only one.)
3. A *primipara* is a woman who has delivered one pregnancy in which the child has reached viability, without regard to the child's being alive or dead at the time of birth. Some authors consider that the designation of primipara includes women in the process of giving birth to their first child.
4. A *multipara* is a woman who has had two or more pregnancies that terminated at the stage when the children were viable.
5. A *parturient* is a woman in labor.

Gravida and Para

1. A woman pregnant for the first time is a primigravida and is described as gravida 1, para 0.
2. If she aborts before viability, she remains gravida 1, para 0.
3. If she delivers a fetus that has reached viability, she becomes a primipara, regardless of whether the child is alive or dead. She is now gravida 1, para 1.
4. During a second pregnancy, she is gravida 2, para 1.
5. After she delivers the second child, she is gravida 2, para 2.
6. A patient with two abortions and no viable children is gravida 2, para 0. When she becomes pregnant again, she is gravida 3, para 0. When she delivers a viable child, she is gravida 3, para 1.
7. Multiple births do not affect the parity by more than one. A woman who has viable triplets in her first pregnancy is gravida 1, para 1.

TPAL

A different way of describing the patient's obstetrical situation is as follows:

T=Term pregnancies

P=Premature births

A=Abortions

L=Living children

Spontaneous Abortions (miscarriage)

Induced Abortions

Source: "The Course and Conduct of Normal Labor and Delivery", Dr. Keith P. Russell.
Current OB/Gyn Diagnosis and Treatment, Ralph C. Benson, 3rd ed.

Definitions of Abortion Procedures

Spontaneous Abortion (Also known as miscarriage) — Abortion occurring naturally, without external influence. May include either of the following types of complications of pregnancy *not* caused by an induced abortion: a) Complete or incomplete expulsion of the products of conception from the uterus, b) Failure of embryonic development or death of the fetus in utero.

Induced Abortion — A procedure (as contrasted with a complication) intended to terminate a suspected or known intrauterine pregnancy and to produce a nonviable fetus at any gestational age. For this definition, the deciding factor is the intent of the procedure rather than its result. Thus, if the procedure failed to have any effect on the pregnancy, we would nevertheless consider it an induced abortion. Also, if the person performing the procedure was under the mistaken impression the woman had an intrauterine pregnancy with a living embryo or fetus, then we would consider the procedure an induced abortion, regardless of whether the woman in fact had an ectopic or molar pregnancy, or no pregnancy at all. *However*, if a molar pregnancy, ectopic pregnancy, or death of the fetus had already been diagnosed before an intervention, then we would not regard the procedure as an induced abortion.

Suction Curettage (Also known as vacuum aspiration and uterine aspiration.) — In this procedure the cervical canal is dilated by the use of devices such as laminaria or metal dilators. When the opening is large enough, a flexible tube (cannula) is inserted into the uterine cavity and the fetal and placental tissues are then suctioned out by a vacuum pump.

Dilation and Evacuation (Also known as dilation and extraction, D&E.) — This procedure is very similar to the suction curettage. Surgical instruments are used, in addition to a vacuum tube, to remove the fetal and placental tissue.

Sharp Curettage (Also known as dilation and curettage, surgical curettage, D&C.) — This procedure involves the dilation of the cervix as in suction, although usually to a larger diameter. The fetal and placental tissues are then scraped out with a curette, which resembles a small spoon.

Intra-Uterine Saline Instillation (Also known as intra-amniotic saline instillation, saline abortion, and saline amniotic fluid exchange.) — This procedure entails withdrawing a portion of the amniotic fluid from the uterine cavity by a needle inserted through the abdominal wall and replacing this fluid with a concentrated salt solution. This process induces labor, which results in the expulsion of the usually dead fetus approximately 24 to 48 hours later.

Intra-Uterine Prostaglandin Instillation (Also known as intra-amniotic prostaglandin instillation.) — This procedure involves injecting a prostaglandin — a substance with hormone-like activity — into the uterine cavity through a needle inserted through the abdominal wall. The interval between injection and expulsion tends to be shorter than in a saline abortion.

Hysterotomy — This procedure involves surgical entry into the uterus, as in a caesarean section, that removes a fetus that is too small to survive even with extraordinary life support measures. It is usually performed only if other abortion procedures fail.

Hysterectomy — In this procedure, the uterus is removed either with the fetus inside or after the fetus is removed. It is usually performed only when a pathological condition of the uterus, such as fibroid tumors, warrants its removal.

Other — All other procedures should be shown as "Other" and the specific procedure listed. This category includes using a combination of agents, such as urea and prostaglandin, prostaglandin and oxytocin, or prostaglandin and saline.

Source: These definitions are based on the following publications: Center for Disease Control, *Abortion Surveillance Report*, November, 1980; and NCHS, *Handbook on the Reporting of Induced Termination of Pregnancy*, 1979, DHEW Pub. No. (PHS) 79-1117, 623-966/904-31.

APPENDIX F

HEIGHT

Feet/Inches	Code Inches
4' 6"	54
4' 7"	55
4' 8"	56
4' 9"	57
4' 10"	58
4' 11"	59
5' 0"	60
5' 1"	61
5' 2"	62
5' 3"	63
5' 4"	64
5' 5"	65
5' 6"	66
5' 7"	67
5' 8"	68
5' 9"	69
5' 10"	70
5' 11"	71
6' 0"	72
6' 1"	73
6' 2"	74
6' 3"	75
6' 4"	76
6' 5"	77
6' 6"	78

APPENDIX G

CONVERSION OF POUNDS AND OUNCES TO GRAMS

P O U N D S	OUNCES																OUNCES
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0	—	28	57	85	113	142	170	198	227	255	283	312	340	369	397	425	
1	454	482	510	539	567	595	624	652	680	709	737	765	794	822	850	879	
2	907	936	964	992	1021	1049	1077	1106	1134	1162	1191	1219	1247	1276	1304	1332	
3	1361	1389	1417	1446	1474	1503	1531	1559	1588	1616	1644	1673	1701	1729	1758	1786	
4	1814	1843	1871	1899	1928	1956	1984	2013	2041	2070	2098	2126	2155	2183	2211	2240	
5	2268	2296	2325	2353	2381	2410	2438	2466	2495	2523	2551	2580	2608	2637	2665	2693	
6	2722	2750	2778	2807	2835	2863	2892	2920	2948	2977	3005	3033	3062	3090	3118	3147	
7	3175	3203	3232	3260	3289	3317	3345	3374	3402	3430	3459	3487	3515	3544	3572	3600	
8	3629	3657	3685	3714	3742	3770	3799	3827	3856	3884	3912	3941	3969	3997	4026	4054	
9	4082	4111	4139	4167	4196	4224	4252	4281	4309	4337	4366	4394	4423	4451	4479	4508	
10	4536	4564	4593	4621	4649	4678	4706	4734	4763	4791	4819	4848	4876	4904	4933	4961	
11	4990	5018	5046	5075	5103	5131	5160	5188	5216	5245	5273	5301	5330	5358	5386	5415	
12	5443	5471	5500	5528	5557	5585	5613	5642	5670	5698	5727	5755	5783	5812	5840	5868	
13	5897	5925	5953	5982	6010	6038	6067	6095	6123	6152	6180	6209	6237	6265	6294	6322	
14	6350	6379	6407	6435	6464	6492	6520	6549	6577	6605	6634	6662	6690	6719	6747	6776	
15	6804	6832	6860	6889	6917	6945	6973	7002	7030	7059	7087	7115	7144	7172	7201	7228	
16	7257	7286	7313	7342	7371	7399	7427	7456	7484	7512	7541	7569	7597	7626	7654	7682	
17	7711	7739	7768	7796	7824	7853	7881	7909	7938	7966	7994	8023	8051	8079	8108	8136	
18	8165	8192	8221	8249	8278	8306	8335	8363	8391	8420	8448	8476	8504	8533	8561	8590	
19	8618	8646	8675	8703	8731	8760	8788	8816	8845	8873	8902	8930	8958	8987	9015	9043	
20	9072	9100	9128	9157	9185	9213	9242	9270	9298	9327	9355	9383	9412	9440	9469	9497	
21	9525	9554	9582	9610	9639	9667	9695	9724	9752	9780	9809	9837	9865	9894	9922	9950	
22	9979	10007	10036	10064	10092	10120	10149	10177	10206	10234	10262	10291	10319	10347	10376	10404	

Birthweight

When necessary to convert pounds and ounces to grams, first convert to ounces (e.g., 7 pounds 6 ounces = 118 ounces), then multiply the ounces by 28.349527 grams (1 ounce = 28.349527 gms).

Example: 7 pounds 6 ounces
 112 ounces 6 ounces

118 ounces
x 28.349527

3345.244186 grams

rounding rules: If the first 2 digits to the right of the decimal point are: 49 or less, drop all numbers; if the numbers are 51 or more, round the first digit to the left of the decimal point up to the next number; if the first 2 digits to the right of the decimal are 50, then: if the left digit is odd, you round up — if it is even, you do not change the number. Example: 34.49 is 34; 34.51 is 35; 34.50 is 34; 35.50 is 36.

APPENDIX H

APGAR RATING EVALUATION OF THE NEWBORN INFANT (Method of Scoring)

Five minutes after the *complete* birth of the infant (disregarding the cord and placenta) the following five objective signs are evaluated and each given a score of 0, 1, or 2. A score of 0—3 indicates a child in severe condition; 3—6 is mild to moderate asphyxia (fetal distress); a score of 10 indicates an infant in the best possible condition.

Sign	0	1	2
Heart rate	Absent	Slow (below 100)	Over 100
Respiratory effort	Absent	Slow — Irregular	Good crying
Muscle tone	Limp	Some flexion of extremities	Active motion
Response to catheter in nostril (tested after oropharynx is clear.)	No response	Grimace	Cough or sneeze
Color	Blue Pale	Body pink Extremities blue	Completely pink

FOR HOSPITAL USE ONLY

IF ANY OF ITEMS 28 THRU 31 ON CERTIFICATE OF LIVE BIRTH (FORM VS-10) ARE ANSWERED YES, USE THE CODES INDICATED ON THIS WORK SHEET FOR THE APPROPRIATE ITEM NUMBER.

Item 28. COMPLICATIONS OF PREGNANCY AND CONCURRENT ILLNESSES (Use as many codes as are appropriate)

01	Placental Complications	09	Pulmonary
02	Pre-Eclampsia/Eclampsia/Toxemia	10	Syphilis
03	Hemoglobinopathy	11	Rubella
04	Urinary Tract/Kidney Infection	12	Rh ₀ (D) Isoimmunization
05	Anemia Less Than 10 Gm HB	13	Unspecified Uterine Bleeding not Associated with Labor
06	Drug and Alcohol Abuse	14	Renal Disease
07	Heart Disease/Essential Hypertension	15	Other
08	Diabetes		

Item 29A. COMPLICATIONS OF LABOR AND DELIVERY (Use as many codes as are appropriate)

1	Amnionitis/Sepsis	5	Fetal Distress
2	Hemorrhage Associated with Labor	6	Maternal Blood Transfusion
3	Cephalopelvic Disproportion	7	Postpartum Hemorrhage
4	Breech or Other Abnormal Presentation	8	Other

Item 29B. IF CAESAREAN SECTION WAS PERFORMED, ENTER APPROPRIATE CODE:

1	Emergency Primary	3	Elective Primary
2	Emergency Repeat	4	Elective Repeat

Item 30. BIRTH INJURY TO CHILD (Use as many codes as are appropriate)

1	To Brain	3	To Bone or Nerve
2	To Spinal Cord	4	Other

Item 31. CONGENITAL MALFORMATION (Use as many codes as are appropriate)

01	Anencephalus/Spina Bifida (ICD 740–741)	08	Respiratory System (ICD 748)
02	Congenital Hydrocephalus (ICD 742.3)	09	Digestive System (ICD 750–751)
03	Other Nervous System Anomalies (ICD 742, Excluding 742.3)	10	Genito-Urinary System (ICD 752–753)
04	Eyes (ICD 743)	11	Musculoskeletal System (ICD 754–756)
05	Cleft Lip/Palate (ICD 749)	12	Skin, Hair, Nails (ICD 757)
06	Other Ear, Face, Neck (ICD 744)	13	Down's Syndrome (ICD 758.0)
07	Heart/Circulatory System (ICD 745–747)	14	Other (ICD 758–759, Excluding 758.0)

Do not enter any identification by name or number of the patient on this work sheet.

FOR HOSPITAL USE ONLY

IF ANY OF ITEMS 28 THRU 31 ON CERTIFICATE OF LIVE BIRTH (FORM VS-10) ARE ANSWERED YES, USE THE CODES INDICATED ON THIS WORK SHEET FOR THE APPROPRIATE ITEM NUMBER.

Item 28. COMPLICATIONS OF PREGNANCY AND CONCURRENT ILLNESSES (Use as many codes as are appropriate)

01	Placental Complications	09	Pulmonary
02	Pre-Eclampsia/Eclampsia/Toxemia	10	Syphilis
03	Hemoglobinopathy	11	Rubella
04	Urinary Tract/Kidney Infection	12	Rh ₀ (D) Isoimmunization
05	Anemia Less Than 10 Gm HB	13	Unspecified Uterine Bleeding not Associated with Labor
06	Drug and Alcohol Abuse	14	Renal Disease
07	Heart Disease/Essential Hypertension	15	Other
08	Diabetes		

Item 29A. COMPLICATIONS OF LABOR AND DELIVERY (Use as many codes as are appropriate)

1	Amnionitis/Sepsis	5	Fetal Distress
2	Hemorrhage Associated with Labor	6	Maternal Blood Transfusion
3	Cephalopelvic Disproportion	7	Postpartum Hemorrhage
4	Breech or Other Abnormal Presentation	8	Other

Item 29B. IF CAESAREAN SECTION WAS PERFORMED, ENTER APPROPRIATE CODE:

1	Emergency Primary	3	Elective Primary
2	Emergency Repeat	4	Elective Repeat

Item 30. BIRTH INJURY TO CHILD (Use as many codes as are appropriate)

1	To Brain	3	To Bone or Nerve
2	To Spinal Cord	4	Other

Item 31. CONGENITAL MALFORMATION (Use as many codes as are appropriate)

01	Anencephalus/Spina Bifida (ICD 740-741)	08	Respiratory System (ICD 743)
02	Congenital Hydrocephalus (ICD 742.3)	09	Digestive System (ICD 750-751)
03	Other Nervous System Anomalies (ICD 742, Excluding 742.3)	10	Genito-Urinary System (ICD 752-753)
04	Eyes (ICD 743)	11	Musculoskeletal System (ICD 754-756)
05	Cleft Lip/Palate (ICD 749)	12	Skin, Hair, Nails (ICD 757)
06	Other Ear, Face, Neck (ICD 744)	13	Down's Syndrome (ICD 758.0)
07	Heart/Circulatory System (ICD 745-747)	14	Other (ICD 758-759, Excluding 758.0)

Do not enter any identification by name or number of the patient on this work sheet.

APPENDIX C
TECHNICAL NOTES

TECHNICAL NOTES

1. The Birth Cohort File

The Birth Cohort File was employed to extract a matched comparison group for medical outcome data. The Birth Cohort File is developed annually by a joint effort of MCH and the Center for Health Statistics. It is created by linking birth certificates with fetal death and other death records. One feature of the 1978 Birth Cohort File is that it contains a Medi-Cal indicator. This was obtained by matching the Medi-Cal paid claims tapes with the 1978 birth file. This is the only year for which the match has been done. The matching was done using the following variables: county of residence, hospital code, date of birth, and the last name of the Medi-Cal beneficiary. Fifty percent of the files matched on all 4 variables and, by relaxation of the standard of match, over 80 percent of the births were eventually matched.

It was this Medi-Cal matched Birth Cohort File that was run against all the OB Access cases, and 5,244 matched comparison cases were obtained. Hence, the project was able to compare pregnancy outcome for women who lived in the same county, were of nearly identical age, same ethnicity, and had a similar number of previous births.

2. Chi-Square Tests

For Tables 14 and 15 presented in the text, the chi-square statistic was used to test whether there was a difference between the distributions of birth outcome as indicated by birthweight category for two prenatal care variables (full versus partial care and early versus late care). The statistic was computed using the standard formula for contingency tables:

$$\text{Chi-square} = \sum \frac{(O - E)^2}{E}, \text{ where}$$

O = Observed cell frequencies, and

E = Expected cell frequencies.

Each expected cell frequency was derived from row and column totals for the row and column containing that cell. A significant chi-square statistic led to the rejection of the null hypothesis and acceptance of the likelihood of a difference in outcome for different prenatal care categories.

For Tables 13 and 16 of the text, tests of significance were not computed. Because these data were based on matched pairs from the OB Access and Medi-Cal match groups, a different tabulation of the same data was more appropriate for computation of the chi-square statistic. First, frequency of occurrence was compiled for each of four different matched pairs labeled as follows:

- A -- Those pairs where both the OB Access and matched Medi-Cal comparison mother gave birth to a low birthweight (under 2,500 grams) infant.
- B -- Those pairs where the OB Access mother had a low birthweight infant while the Medi-Cal match mother had a normal birthweight infant.
- C -- Those pairs where the Medi-Cal match mother had a low birthweight infant while the OB Access mother had a normal birthweight infant.
- D -- Those pairs where both mothers had normal birthweight infants.

Using the corresponding lowercase letters to represent the frequency of occurrence for these types of pairs, the chi-square statistic was computed from the formula:

$$\text{Chi-square} = \frac{(|c - b| - 1)^2}{b + c}, \text{ where } df = 1$$

This formula includes a correction for continuity because it is based on a two-by-two table. It is interesting to note that only the pairs where the two members had different outcomes contribute to the value of the statistic in the formula.

The two tables below provide the data needed to compute the chi-squares and give the results of the chi-square tests. Table C-1 corresponds to Table 13 in the text, and Table C-2 corresponds to Table 16.

Table C-1

Birthweight Outcomes for Pairs in the Matched Study Group
Where the OB Access Member Had Received Full Prenatal Care

Frequencies		Medi-Cal Match	
		Birthweight Under 2,500 Grams	Birthweight 2,500 Grams or Over
Full-Care OB Access <u>1/</u>	Birthweight Under 2,500 Grams	12 (A)	75 (B)
	Birthweight 2,500 Grams or Over	206 (C)	2,532 (D)

Chi-square = 60.1, df = 1 (p < .001)

1/ Full care is defined as a minimum of eight prenatal exams (including a comprehensive initial exam), a psychosocial needs assessment, a health education needs assessment, a nutrition needs assessment, at least one birth education class, and a supply of prenatal vitamins.

Note: Only single live born infants are included; twins, triplets, etc., are excluded.

Source: State of California, Department of Health Services, 1978 Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Table C-2

Birthweight Outcomes for Pairs in the Matched Study Group

Frequencies		Medi-Cal Match	
		Birthweight Under 2,500 Grams	Birthweight 2,500 Grams or Over
OB Access	Birthweight Under 2,500 Grams	24 (A)	220 (B)
	Birthweight 2,500 Grams or Over	344 (C)	4,636 (D)

Chi-square = 26.8, df = 1 (p < .001)

Note: Only single live born infants are included; twins, triplets, etc., are excluded.

Source: State of California, Department of Health Services, 1978 Birth Cohort File and OB Access Pilot Project Data Base (July 1979-June 1982).

Both chi-square statistics are significant. The second chi-square formula given above is evaluating the significance of the difference in the incidence of low birthweight between the Medi-Cal and OB Access match cases. This is discussed in the development of the formula in a standard reference on rates and proportions by Fleiss ^{1/} from which the following analysis has also been adapted.

From Table C-1, the proportion of low birthweight in the 2 groups can be computed by taking totals for the first column and the first row, respectively, and dividing by the total N for the table (N = 2,825). Thus, the 218 low birthweight Medi-Cal cases represent a proportion of 0.077, while the 87 low birthweight OB Access cases represent a proportion of 0.031. (These proportions correspond to the percent low birthweight derived by combining categories in Table 13 as well.) To reiterate what was mentioned above, the difference between these proportions (0.046) is what is evaluated for significance by the chi-square test.

^{1/} Fleiss, Joseph L.: Statistical Methods for Rates and Proportions. New York. John Wiley, 1973, 72-83.

Dividing the difference between the proportions (0.046) by the proportion for the Medi-Cal match group (0.077) gives a value (0.597) which indicates the "value" of providing the full OB Access package of care, relative to standard Medi-Cal care, all other things being equal. Subject to the knowledge that there were many uncontrolled factors in the present study, one could further interpret this statistic by saying that for every 100 infants born with low birthweight under present Medi-Cal care provisions, 60 of these would be expected to have a normal birthweight under the more comprehensive OB Access program of care. This same result was described on page 41 of the text of this report as a 60 percent reduction in low birthweight.

Fleiss also provides a formula for the estimated standard error of the relative difference statistic. For the value of 0.597 associated with Table C-1, the standard error is 0.049.

The foregoing analysis can be repeated for the data in Table C-2. The difference in proportions here is 0.0237 which gives a relative difference of 0.337. This corresponds to the approximate 33 percent reduction in low birthweight discussed on page 41 of the text. The standard error of this relative difference is 0.053.

The analysis could also be carried out starting with three birthweight categories and then focusing on differences when each category is contrasted with the remaining categories one at a time. This will not be done here because (1) the analysis is intended to be as brief and understandable as possible, (2) the emphasis in this study has been on the incidence and avoidance of low birthweight in general although the lowest birthweight categories are clinically the most challenging and the most expensive, and (3) some cells have zero entries when certain very low birthweight frequencies are compiled for the matched pairs.

3. The Abstraction of the Medi-Cal Inpatient Cost Data on OB Access Medi-Cal Women

The project wished to obtain as complete fiscal information as possible on the Medi-Cal women in the project. The prenatal care expenditures were recorded in the OB Access Project Data Base as the Claims Unit processed payments to contractors. Inpatient costs for OB Access Medi-Cal women were paid by the State's fiscal intermediary. It was hence necessary to retrieve those inpatient claims data.

Several approaches were tried. The first was to acquire a hard copy of the actual Medi-Cal expenditures for the project patients. Due to contractual problems between the State and its fiscal intermediary, data for all the patients could not be provided. The second effort forced the project to use the Analytic Information Data System (AIDS) data base (see note below), which is a nonrandom sample of approximately ten percent of all paid claims records.

After much effort, data covering only 138 out of 3,200 patients were found. This minimal number of cases offered little statistical reliability.

The last effort, which eventually gave the data base used in the final analysis, came as the result of prolonged negotiations between DHS and the fiscal intermediary, Computer Science Corporation (CSC). They eventually furnished an IBM format tape with claims data on 3,200 OB Access Medi-Cal beneficiaries. However, adequate documentation of the record layout format did not accompany the tape. The translation of this COBOL tape into SAS was time consuming, but the net result was that complete records were extracted on only 1,581 of the 3,200 women. As there was no access to original records and only limited access to a small portion of the hard copy records, it was impossible to investigate the reasons for this low number. One possible reason why the remainder was not found would be attributed to transcription or coding problems with the 13-digit Medi-Cal ID number on the source documents.

Focusing on the appropriateness of records which were retrieved, only pregnancy-related claims were selected for further analysis. Hence, full fiscal data were obtained on 1,254 OB Access Medi-Cal women.

4. The AIDS Files

The OB Access project used the Analytic Information Data System (AIDS) files to obtain Medi-Cal expenditure data for the Same Counties Comparison Group (see description below). The Medi-Cal AIDS is a set of computer files containing Medi-Cal paid claims and eligibility history data. The files were designed and created during the period 1978-1982, and represent a set of data files that are smaller, better organized, and therefore more accessible than the files that were previously available. The Medi-Cal program's main computer files contain a great deal of data. However, because of the extremely large size of the computer files, and their lack of appropriate organization, the data have not been readily employed to meet continually changing and diverse program information needs.

Accessibility of the AIDS files has been achieved through the combined use of sampling techniques, selective partitioning of files, and elimination of infrequently used data elements with the resulting records being called "short paid claims". The smaller data sets provided by the AIDS subsystems allow special studies to be completed more quickly and at much less cost than was previously possible. The smaller data sets also make it possible to link data in ways that in the past was impractical and, in some cases, technically impossible.

5. The Same Counties Comparison Group

The project needed to develop fiscal information on a comparison group. The most useful group to obtain fiscal data on would have been the 1978 Medi-Cal comparison cases forming the "match" in the Matched Study Group. Cost data could not be obtained for these Medi-Cal cases drawn from the 1978 Birth Cohort File. Specifically, the original Medi-Cal claims data on these cases were not available to the project because the State had changed fiscal intermediaries. The only data base available with expenditure data in sufficient detail was the AIDS data base. A stratified random sample of all Medi-Cal financed births for 1978 was drawn from the same counties where the OB Access project operated in the following years (1979-1982). These were extracted without regard for any other match criteria. Data were obtained for 1,708 cases. This was the same Counties Comparison Group whose expenditures were compared with OB Access expenditures.

APPENDIX D

COMPARISON BETWEEN OB ACCESS
AND EARLIER PERINATAL PROJECTS
IN CALIFORNIA

**KEY SIMILARITIES AND DIFFERENCES BETWEEN THE OB ACCESS PROJECT AND
THE SAN JOAQUIN PERINATAL AND OAKLAND PERINATAL HEALTH PROJECTS**

OB ACCESS PROJECT CHARACTERISTICS	SAN JOAQUIN PERINATAL PROJECT SIMILARITIES/DIFFERENCES	OAKLAND PERINATAL HEALTH PROJECT SIMILARITIES/DIFFERENCES
<p><i>Project Purpose</i></p> <p>To demonstrate an alternative approach to the financing and delivery of comprehensive obstetrical services to low income women.</p>	<p><i>Difference</i></p> <p>To provide a preliminary pilot study on regionalization of perinatal care for high risk women with emphasis on the coordination and continuity of care from the prenatal to inpatient stages.</p>	<p><i>Difference</i></p> <p>To impact the high infant mortality rates in identified areas through the direct funding of health services including prenatal care, infant care, family planning, health education and outreach, as well as teacher training and a media campaign.</p>
<p><i>Time Frame</i></p> <p>Services provided from July 1979 through June 1982.</p>	<p><i>Difference</i></p> <p>Services provided from September 1977 through December 1978.</p>	<p><i>Difference</i></p> <p>Services provided from January 1979 through June 1981.</p>
<p><i>Target Population</i></p> <p>Medi-Cal and other low income women in 13 urban and rural counties.</p>	<p><i>Difference</i></p> <p>High-risk women in Fresno County.</p>	<p><i>Difference</i></p> <p>Six health planning areas of Alameda County.</p>
<p><i>Patients</i></p> <p>Approximately 7,500 low income pregnant women.</p>	<p><i>Difference</i></p> <p>Pregnant women identified as high risk. Over 450 high risk women were in the project group. (<i>Similarly:</i> Most women served by the project were found to be low income. A relatively large portion were undocumented aliens.)</p>	<p><i>Difference</i></p> <p>Infants to age one year and teenagers were served as well as pregnant women. Approximately 2,150 women and infants were served. A relatively large portion of prenatal patients were Black, Southeast Asian, and Hispanic.</p>
<p><i>Scope of Services</i></p> <p>Standardized package of prenatal medical care plus comprehensive services including health education, nutrition, and psychosocial assessments and follow-up.</p>	<p><i>Similarity</i></p> <p>Prenatal, Intrapartum, and postpartum medical care plus ancillary components of health education, social services, nutrition, and nursing care. (<i>Difference:</i> ancillary components were not consistently or fully implemented over the term of the project.)</p>	<p><i>Difference</i></p> <p>Independent projects covered a wide range of services including adolescent sex education, teacher training, family planning, adolescent psychosocial services and care, bilingual/bicultural infant care, and media campaigns as well as prenatal care.</p>
<p><i>Care Providers</i></p> <p>Eleven contractors including county health departments, a university medical center, community clinics, health coalitions, plus subcontractors.</p>	<p><i>Difference</i></p> <p>Deliveries all at one hospital; prenatal care at county health department, a medical center, and local health centers.</p>	<p><i>Difference</i></p> <p>Over 20 separate projects through hospitals, neighborhood or community clinics and organizations, Planned Parenthood, the YWCA, a health consortium, and components of the county Health Care Systems Agency.</p>

APPENDIX E

DEVELOPING THE INDEX
OF MATERNITY CARE COSTS

INDEX OF MATERNITY CARE COSTS

The Medi-Cal Control Match group data are based on Fiscal Year 1977-78 and the associated fiscal data reflect the actual costs for that group for that year. The OB Access/Title XIX Group data are for Fiscal Years 1979-80, 1980-81, and 1981-82. Hence, it is necessary to adjust the cost data for the MMC group for those years to make an equitable comparison. Although it would methodologically be preferable to repeat the matching process for these years and compare the actual cost experience, the birth certificate reporting format was changed in 1979. The data which were the basis for the match were not collected in following years.

In summary, to establish a comparable cost basis for the Match group, a specific Laspeyer type price index of maternity costs for California Medi-Cal recipients has been developed. The method is as follows: There are two principal components in the composition of publically financed maternity services, (a) the professional services including prenatal, delivery, and postpartum care costs; and (b) the inpatient costs. Previous studies indicate that type (a) costs make up 50 percent of total costs and type (b) 50 percent of the total. The components of type (a) expenses fall mainly under the Maternity Care Codes of California Relative Value Studies (CRVS). 1/ Type (b) expenses are under Revenue and Cost Averages of the Facilities Commission Report (CHFC). 2/ One can now construct an index appropriate to professional service and inpatient service costs.

1/ See Exhibits 1 and 2 for schedules and rate history.

2/ See Exhibits 3 and 4 for Health Care Facilities Report.

Table E-1

PROFESSIONAL SERVICE COMPONENT

<u>Fiscal Year</u>	<u>Increase in Conversion 1/ Coefficient for Year End</u>	<u>Year End Value</u>	<u>Effective 2/ Annual Rate*</u>
1977-78	-0-	100	100
1978-79	-0-	100	100
1979-80	+47%	147	139.45
1980-81	+ 9%	160.23	159.05
1981-82	+ 6%	169.84	168.96

NOTE:

- 1/ Based on Medi-Cal conversion coefficient, which are the dollar amounts that are applied to the value units to produce the amount payable by Medi-Cal.
- 2/ Because of interyear rate adjustments, the effective annual rate is calculated by using the weighted average for the year.

The second aspect is that of the inpatient maternity care which comprises 50 percent of the total cost. This inpatient service component is made up of two main elements, (1) the charges for use of labor and delivery room and (2) the daily room rate. Based on CHFC data, then (1) = 45 percent of the total inpatient charge and item (2) = 55 percent. This amount is calculated by multiplying the average daily room rate for acute obstetrical services times the average length of stay (LOS) for delivery, i.e., $\$274 + (\$120.59 \times 2.9) = \$624.32$. Hence, the relative proportions are reflected. Both item elements have historic data for annual rate of increase. Hence, one can construct a composite price index for inpatient services.

Table E-2

TOTAL EXPENSE PER UNIT OF INPATIENT SERVICE

	Statewide Average Labor/Delivery Charges	% Change	Statewide Room Rate for Acute OB	% Change	Average Cost
1977-78	\$274.61	-0-	\$129.59x2.9	-0-	\$ 624.32
1978-79	318.89	16.12	133.55x2.9	10.74	706.19
1979-80	354.23	11.08	144.88x2.9	8.48	774.38
1980-81	406.11	14.6	164.19x2.9	13.33	822.26
1981-82	462.68	13.93*	186.07x2.9*	10.85	1,002.29*

* Estimate.

Source: CHFC Aggregate Hospital Data for California -- 1980, 1981, and 1982.

Table E-3

INPATIENT OB PRICE INDEX

Year	Labor/Delivery	Proportion	OB Acute Daily Room Rate Index	Proportion	Weighted Average
1977-78	100	25.64	100	74.36	100.00
1978-79	116.12	25.64	110.74	74.36	112.12
1979-80	128.99	25.64	120.13	74.36	122.40
1980-81	147.82	25.64	136.14	74.36	139.13
1981-82	168.41	25.64	150.92	74.36	155.40

Length of Stay = 2.9 days

Table E-4

COMPOSITE WEIGHTED OB SERVICE INDEX

Year	Professional Service <u>1</u> /	Proportion	Inpatient <u>2</u> /	Proportion	Composite
1977-78	100	.50	100	.50	100
1978-79	100	.50	112.12	.50	106.06
1979-80	139.45	.50	122.40	.50	130.93
1980-81	159.05	.50	139.13	.50	149.09
1981-82	168.96	.50	155.40	.50	162.18

Source: 1/ From Table E-1.

2/ From Table E-2.

Length of Stay = 2.9.

Assumption for Index

1. That benefits are similar over the period.
2. That proportions between the elements of the components remain the same.
3. That the Medi-Cal patient services for inpatient care are similar to the population as a whole.
4. Assume ratio of professional service to inpatient is 50:50.

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